Cancers des non-fumeurs

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Liens d’intérêt

- Aucun lien d’intérêt à déclarer en relation avec cette présentation

Définition

- Non fumeur:
- Patient n’ayant jamais fumé
- Tabagisme < 100 cigarettes durant toute sa vie

≠ Ex-fumeur

≠ Fumeur actif

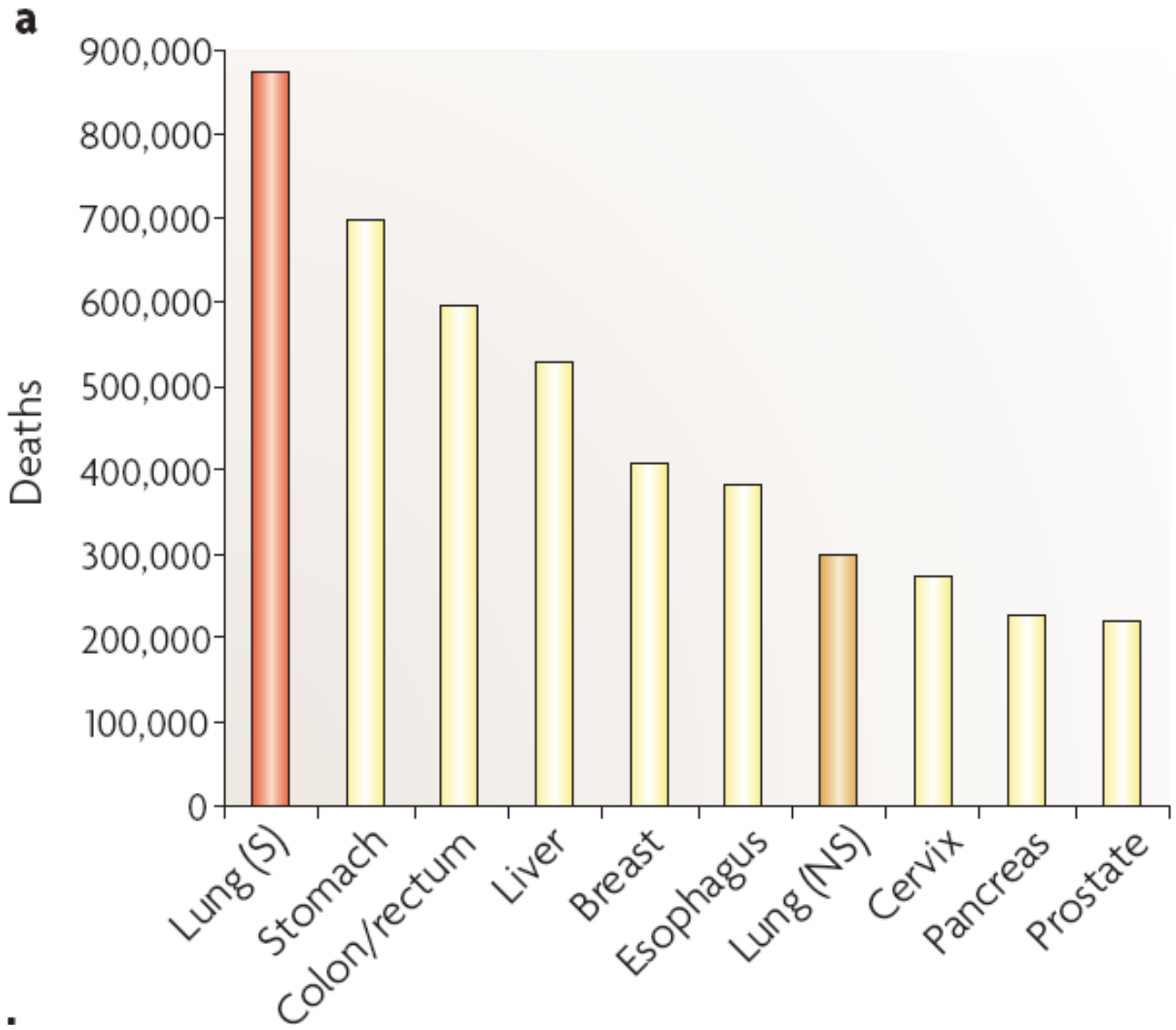
Contexte mondial

- Vaste majorité des CB sont liés au tabagisme actif

! 25% des CB dans le monde ne sont pas attribuables au tabagisme actif

Sun et al Nature Reviews Cancer 2007

Contexte mondial



Sun et al Nature Reviews Cancer 2007

Epidémiologie

- Proportion de non-fumeur est variable et fonction:

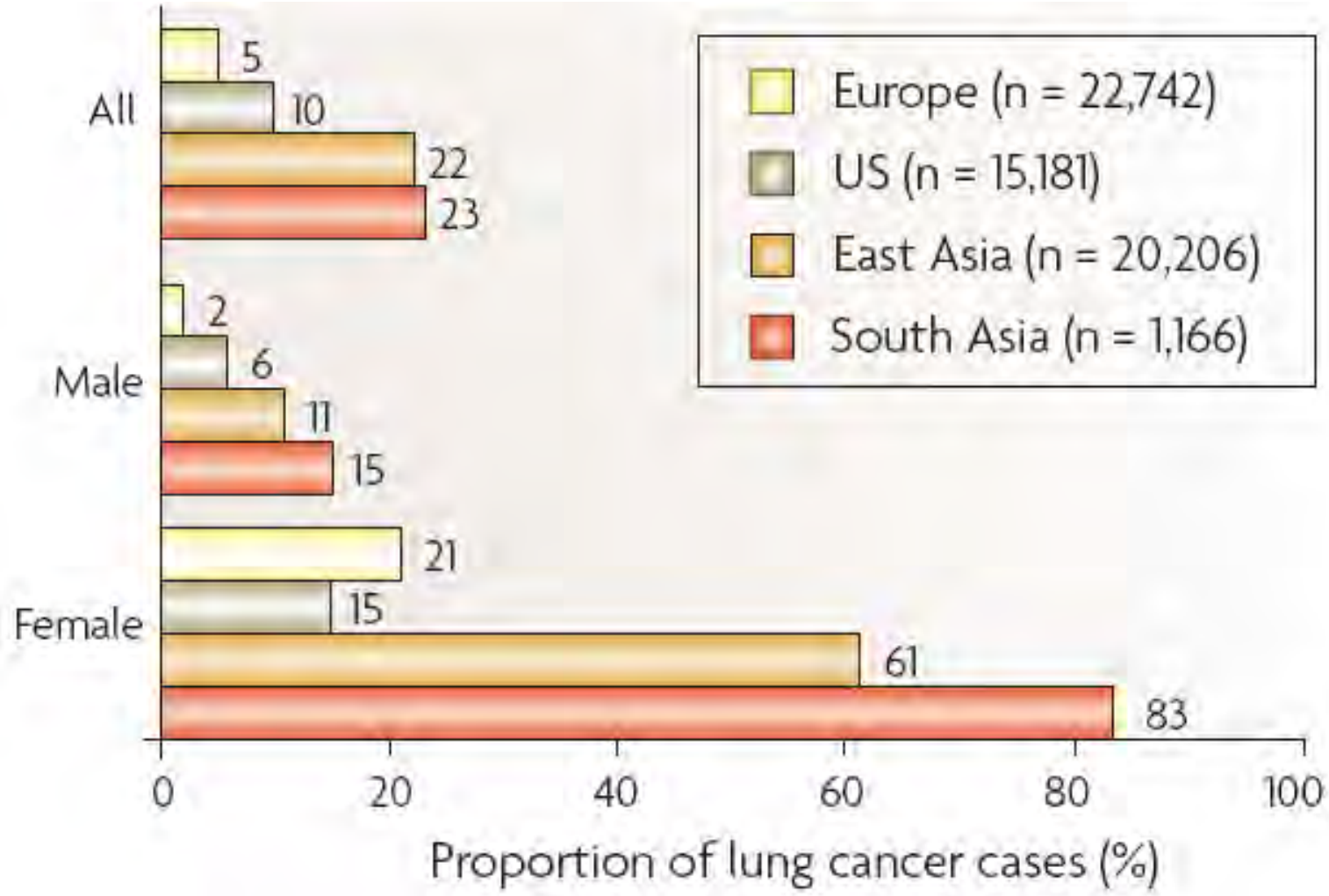
– du sexe

– de la région étudiée

- **Femme**
  - Chine: 65%
  - Japon: 70%
  - Inde du Nord: 94%
  - USA: 9-13%

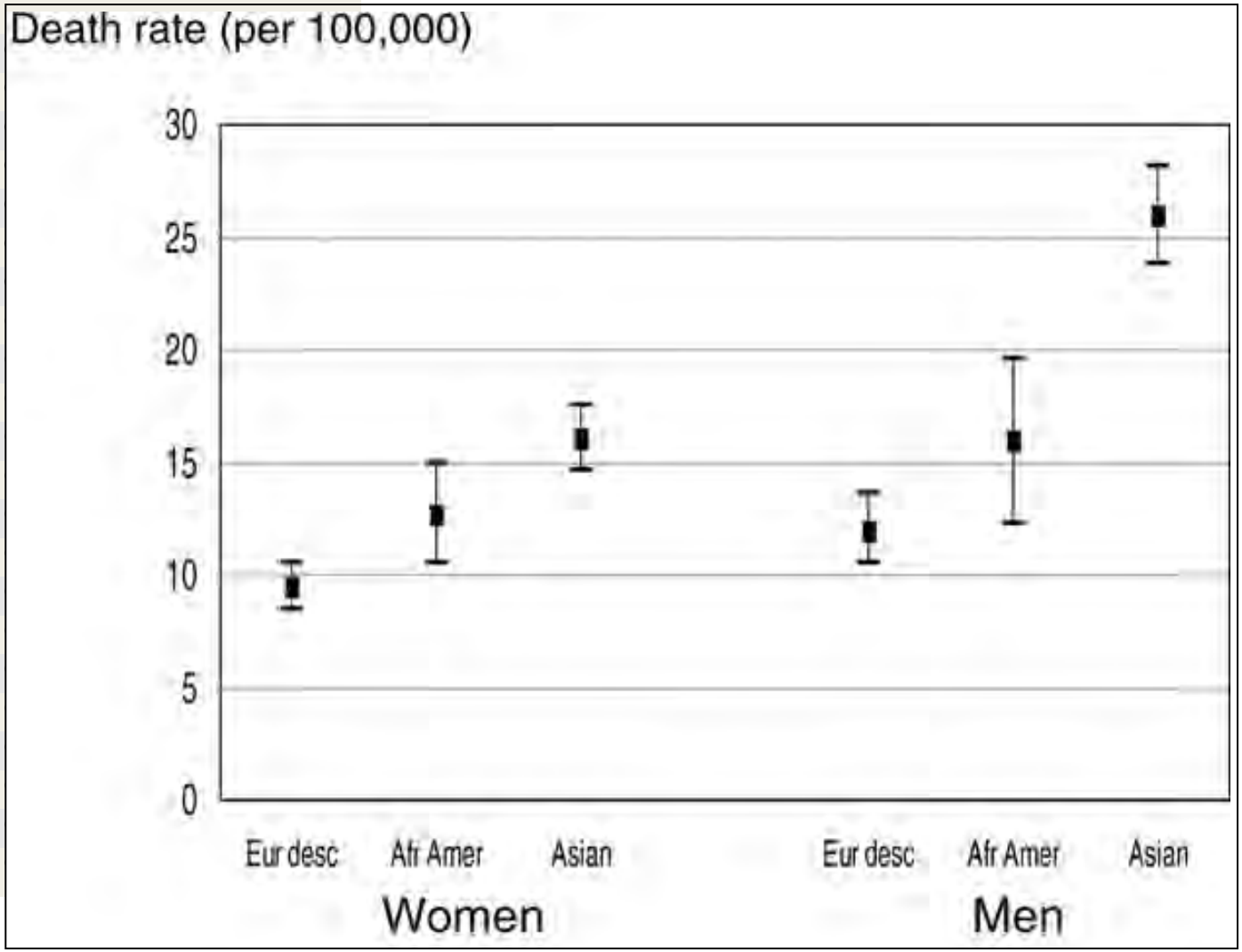
- **Homme**
  - Chine: 3%
  - Japon: 9%
  - Inde du Nord: 19%
  - USA: 2%

Taux en fonction du continent



Sun et al Nature Reviews Cancer 2007

Country/Region	Region/City	Years	Age Standardized Rates[a]
India	Ahmedabad	1983–1	
	Bangalore	1983–1	
	Mumbai	1983–1	
	Madras	1983–1	
Africa	Algeria	1986–1	
	Mali	1987–1	
China	Qidong city	1983–1	
	Shanghai	1983–1	
	Tianjin	1983–1	
	Hong Kong	1983–1	
Japan	Osaka	1983–1	
	Saga	1984–1	
	Yamagata	1983–1	
Philippines	Manila	1983–1	
	Rizal Province	1983–1	
Singapore	Chinese	1983–1	
	Malay	1983–1	
Thailand	Chiang Mai	1983–1	
	Khon Kaen	1988–1	
Other	Spain, Basque	1986–1	
	Kuwait	1983–1	
	US, CT	1935–1	



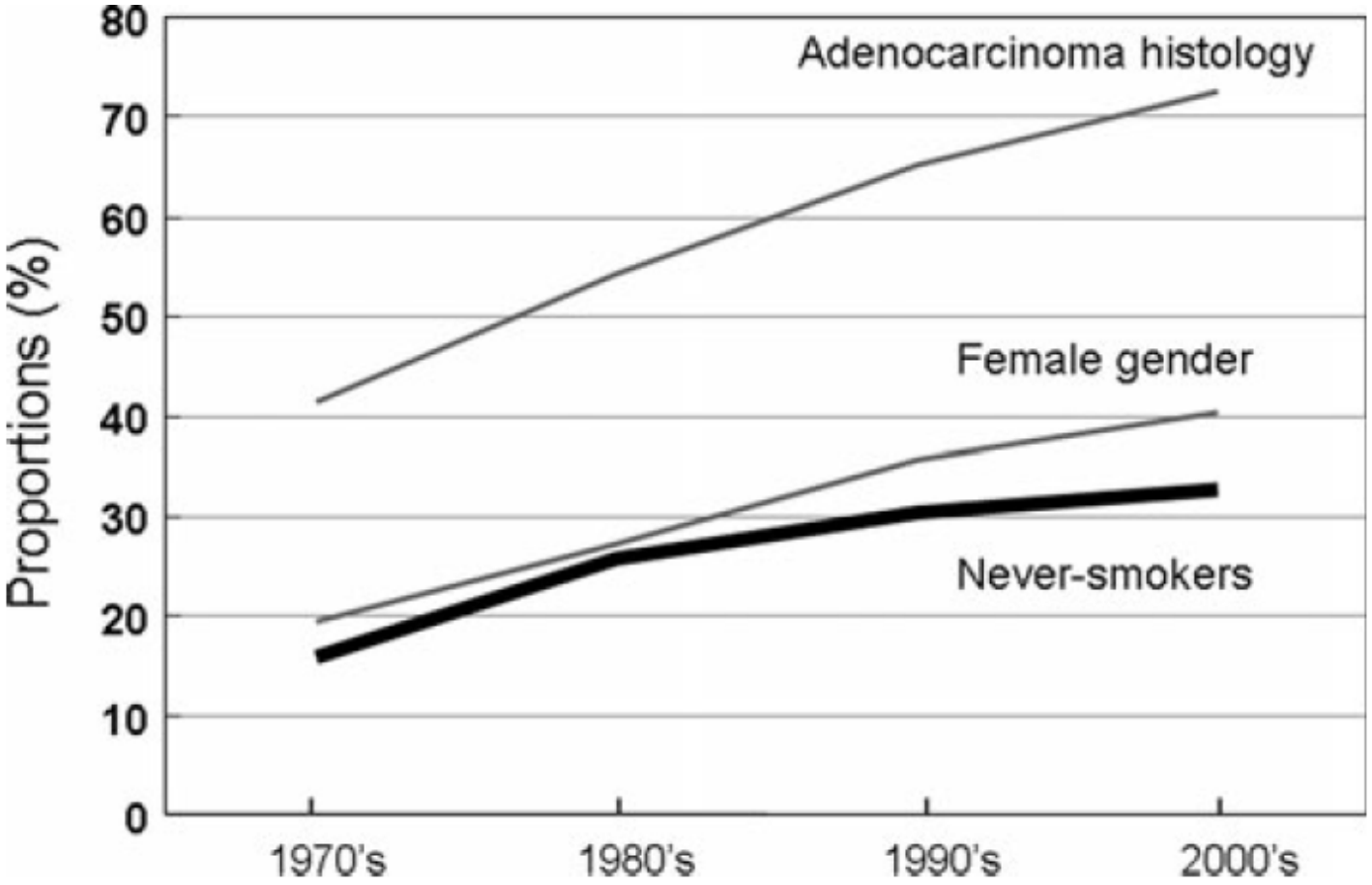
Populations américaines et nord-européennes

Cohorte	Sexe	Non-fumeur		Ex-fumeur		Fumeur actif	
Characteristic		NHS[9,10]	HPFS[9,11]	CTS[12]	MEC[13,14]	U/OLCR[15]	NHEFS[16]
Dates of follow-up		1976 to 2002	1986 to 2002	1995-1996 to 2002	1993-1996 to 2001	2003	1971-1975 to 1992
Age at baseline, years		30-55	40-75	33-79*	45-75	40-79	25-74
Population at risk, No.							
	Male	—	51,529	—	82,460	438,966†	5,075
	Female	121,700	—	108,329	101,359	447,603†	7,637
Incident lung cancer patients, 40-79 years at diagnosis, No.							
	Male	—	528	—	1,078‡	273	160
	Female	1,817	—	393	805‡	250	75
Region		United States	United States	California	California/Hawaii	Uppsala/Örebro, Sweden	United States
Ethnicity		Mostly white	Mostly white	Mostly white	Multiple	Mostly white	Multiple
Follow-up for lung cancer		Biennial questionnaires and medical records, if possible	Biennial questionnaires and medical records, if possible	Linkage to cancer registry	Linkage to cancer registry	Linkage to cancer registry	Questionnaires approximately every 5 years and inpatient records or death certificates§
Smoking data		Biennial questionnaires	Biennial questionnaires	Baseline questionnaire	Baseline questionnaire	Questionnaire for at-risk population; medical records or clinical assessment for patients	Baseline and follow-up questionnaire

Incidence CB par 100.000 personnes-année dans une population de 40-79 ans

Wakelee et al J Clin Oncol 2007

Evolution au cours du temps

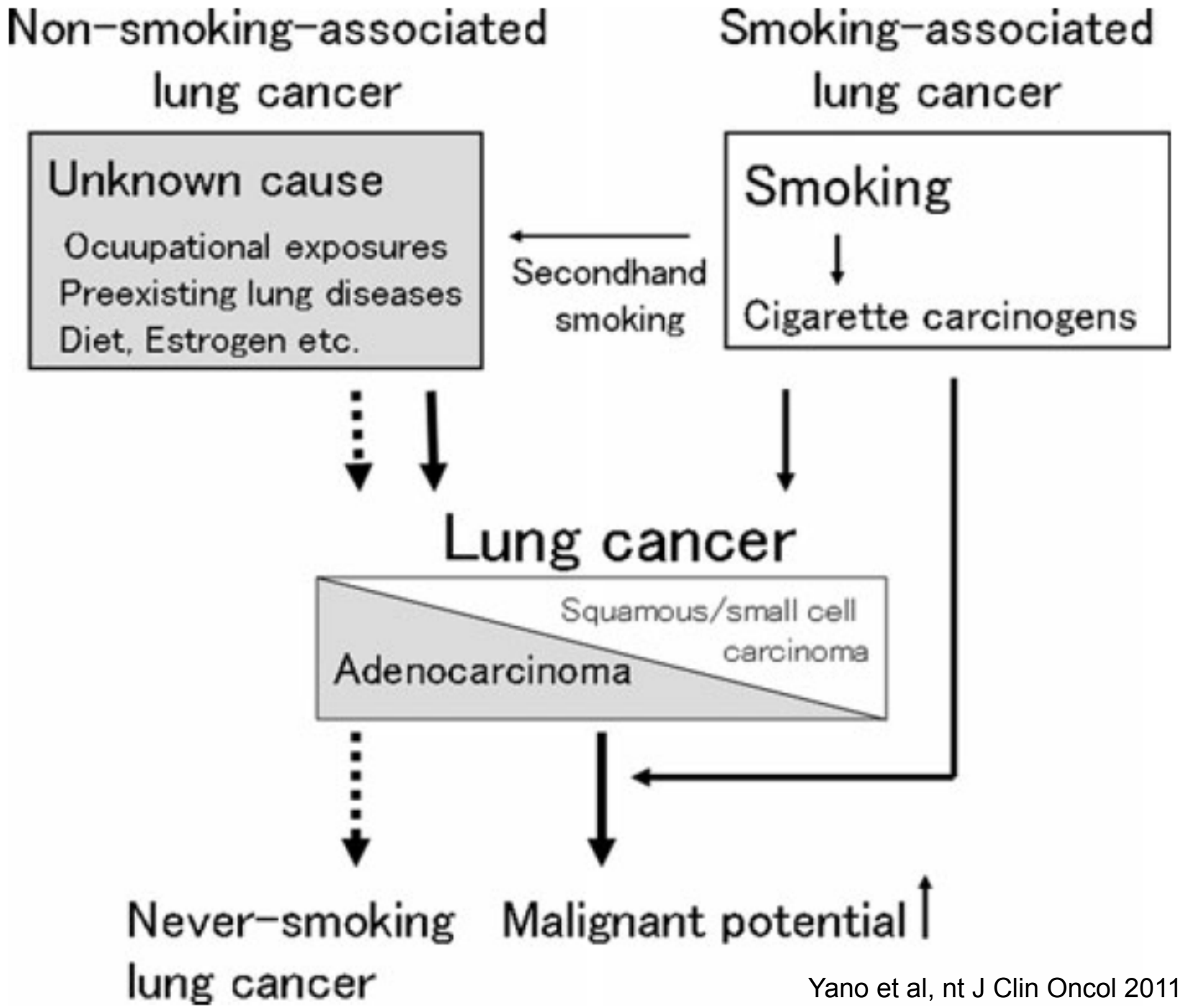


Yano et al, Int J Clin Oncol 2011

Facteurs de risque

Etudes épidémiologiques

- **Problèmes méthodologiques!!!**
  - Choix des populations de référence
  - Evaluation rétrospectives des facteurs de risque et des taux de contamination
  - Mauvaise ou absence de prise en compte d'autres facteurs de risque tels le tabac
  - Définition du patient non-fumeur



Yano et al, nt J Clin Oncol 2011

Principal risk factors (excluding occupational exposure) of lung cancer and corresponding estimated risks as reported in the studies a present review.

Risk factor	Estimated risk(95% confidence interval)	Population
Family history	OR = 1.40 (1.17–1.68)	Never smokers (meta-analysis)
Use of menopausal hormone replacement therapy	OR = 1.76 (1.072–2.898)	Women, never-smokers, adenocarcinoma, (meta-analysis)
Environmental tobacco smoke	OR = 1.26 (1.07–1.47)	Never smokers (meta-analysis)
Domestic radon exposure	10.6% (0.3–28.0) per increase of 100 Bq/m^3	Never smokers (meta-analysis)
Air pollution – increase of 10 $\mu g/m^3$ in $PM_{2.5}$	HR = 1.24 (1.12–1.37)	General population
Air pollution – increase of 10 ppb in SO_2	HR = 1.26 (1.07–1.48)	General population
Air pollution – increase of 10 ppb in NO_2	HR = 1.17 (1.10–1.26)	General population
Cooking oil fumes	OR = 2.12 (1.81–2.47)	Women, never smokers, Chinese (meta-analysis)
Smoke from domestic combustion for heating and cooking	OR = 1.22 (1.04–1.44)	General population, Europe
Patient history of tuberculosis	RR = 1.90 (1.45–2.50)	Never smokers (meta-analysis)
Patient history of COPD/emphysema/chronic bronchitis	RR = 1.22 (0.97–1.53)	Never smokers (meta-analysis)
Patient history of parenchymal infection	RR = 1.36 (1.10–1.69)	Never smokers (meta-analysis)
Low socioeconomic status	RR = 1.65 (1.19–2.28)	General population (meta-analysis)
High intake of fruit	OR = 0.60 (0.46–0.7)	General population but higher in current smokers

Couraud et al, Eur J Cancer 2012

Distribution exposition au tabagisme passif et aux carcinogènes en fonction du sexe

	Men $n = 35$ (%)	Women $n = 32$ (%)	Total $n = 67$	p
No ETS and no occupational exposure	14 (40.00)	10 (31.20)	24	<0.0001[a]
Environmental tobacco smoke				
No ETS	29 (82.9)	10 (31.2)	39	
ETS at home only	0 (0.0)	11 (50.0)	11	
ETS at work only	6 (100.0)	11 (50.0)	17	
Both	6 (17.1)	22 (68.8)	28	
OR ETS/no ETS[c]	1.00	11.0 (3.4–35.4)		<0.0001[a]
Occupational exposure				
Asbestos exposure				
Yes	14 (40.0)	3 (9.4)	17	0.0040[a]
No	21 (60.0)	29 (90.6)	50	
Exposure to other lung carcinogens				
Yes	4 (11.4)	0 (0.0)	4	0.1152[b]
No	31 (88.6)	32 (100.0)	63	
Occupational exposure				
Any occupational exposure	18 (51.4)	29 (90.6)	47	<0.0005[a]
One or more occupational exposure	[illegible]	[illegible]	20	
OR[c]	1.00	0.1 (0.03–0.4)		0.0012[a]

Clément-Duchêne Lung Cancer 2010

Tabagisme passif

Surgeon General Report (81)	Meta-analysis: 52 studies (8 cohort, 44 case-control) of "lifetime nonsmokers"; Total number of cases not stated; Study locations: North America, Europe, Asia; Publication dates: 1981–2002	***Spousal exposure:***			
		Women (no. studies and cases not stated):			
		Smoking husband	vs.	Nonsmoking husband	1.22 (1.10–1.35)
		Men (no. studies and cases not stated):			
		Smoking wife	vs.	Nonsmoking wife	1.37 (1.05–1.79)
		Workplace exposure:			
		Women (25 studies, no. cases not stated):			
		Workplace SHS exposure	vs.	No workplace SHS exposure	1.22 (1.10–1.35)
		Men (11 studies, no. cases not stated):			
		Workplace SHS exposure	vs.	No workplace SHS exposure	1.12 (0.86–1.50)
		Men and Women (25 studies, no. cases not stated):			
		Workplace SHS exposure	vs.	No workplace SHS exposure	1.22 (1.13–1.33)

Active smoking	Exposed to secondhand smoke	Cases	Controls	Unadjusted OR (95% CI)	
Never	Never	651	2,167	1.00	Reference
Never	Ever	1,817	4,890	1.24	(1.12–1.37)
Ever	Never	1,219	1,074	3.78	(3.35–4.26)
Ever	Ever	8,827	5,921	4.96	(4.52–5.45)

Samet et al Clin Cancer Res 2009

Exposure:				
. studies and cases not stated):				
ked during		Mother did not smoke during childhood		1.28 (0.93–1.78)
ked	vs.	Father did not smoke during childhood		1.17 (0.91–1.50)
ildhood				
omen (no. studies and cases not stated):				
ked		Mother did not smoke during childhood		1.15 (0.86–1.52)
ked	vs.	Father did not smoke during childhood		1.10 (0.89–1.36)
childhood				
Either parent smoked during childhood	vs.	Neither parent smoked during childhood		1.11 (0.94–1.31)

Kim et al, Int J Cancer 2014

Impact du tabagisme passif sur le type histologique

	All			Small cell lung cancer	
	Controls	Cases	OR[1] (95% CI)	Cases	OR[1] (95% CI)
Ever exposed to secondhand smoke(based on all studies)					
Never	3,241	1,870	1.00	148	1.00
Ever	10,811	10,644	1.34 (1.24–1.45)	1,008	1.63 (1.31–2.04)
P for heterogeneity			0.01		0.98

Adenocarcinoma		Squamous cell carcinoma		Large cell lung cancer	
Cases	OR[1] (95% CI)	Cases	OR[1] (95% CI)	Cases	OR[1] (95% CI)
904	1.00	425	1.00	75	1.00
5,039	1.35 (1.23–1.48)	2,150	1.36 (1.17–1.58)	565	1.36 (1.04–1.79)
	0.26		0.06		0.68

Kim et al, Int J Cancer 2014

Asbeste

- Risque fonction de l'intensité et de la durée d'exposition et du type de travail.
- 1 f/ml pendant 40 ans augmente le risque de 2 à 80%.
- RR augmente de 1-4% par fibre-année (f-y/ml) → doublement du risque à 25-100 f-y/m

Nielsen et al, Arch Environ Occup Health 2014

Asbeste en milieu professionnel

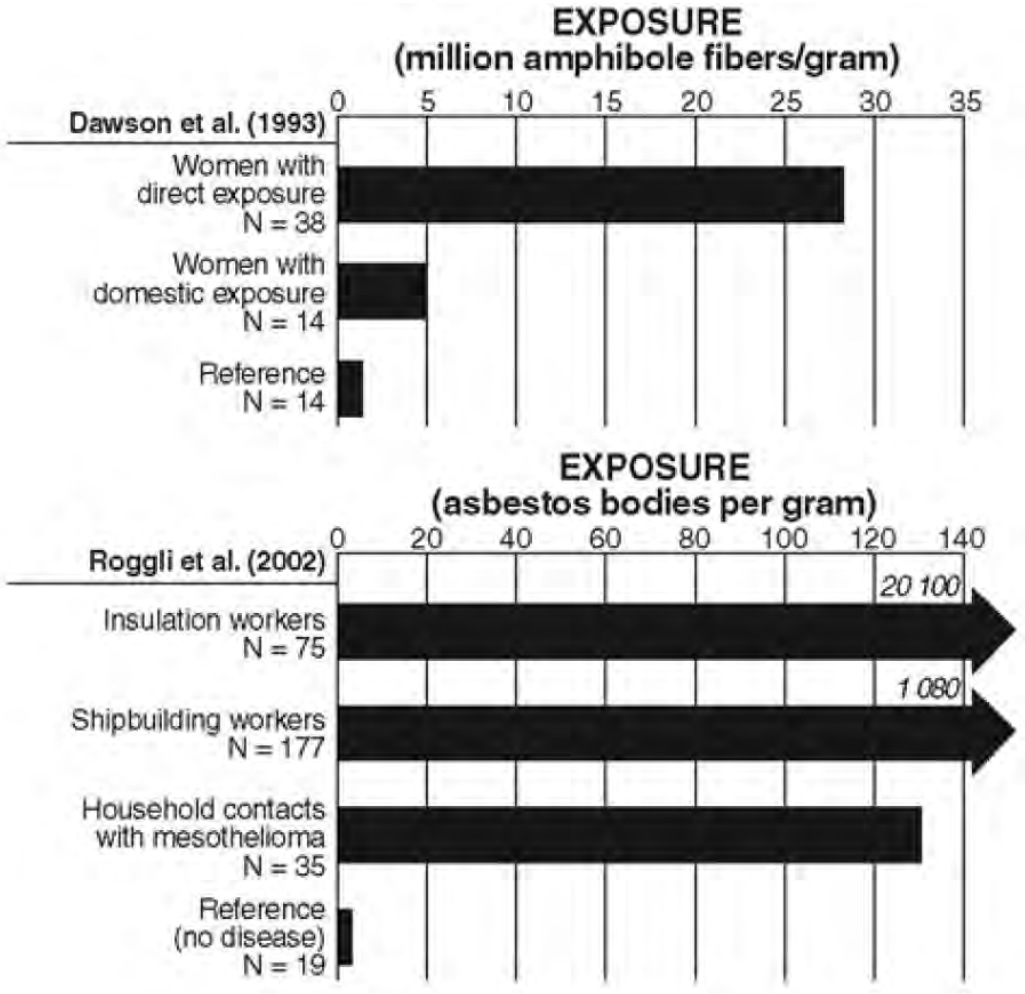
Berry et al. (1985) (S30)	Meta-analysis: 6 studies (5 cohort, 1 case-control) of male and female asbestos workers Study locations: Canada, UK, USA Publication dates: 1968-1983	Lung cancer SMR among never-smoking asbestos workers	vs.	Lung cancer SMR among ever-smoking asbestos workers	1.8 (1.1-2.8)
Liddell (2001) Liddell FDK (S36)	Meta-analysis: 13 cohort studies of asbestos workersStudy locations: Asia, Europe, North AmericaPublication dates: 1972-1993	Lung cancer SMR among nonsmoking asbestos workers	vs.	Lung cancer SMR among asbestos workers that smoke	2.04 (1.28-3.25)

Samet et al Clin Cancer Res 2009

Exposition non professionnelle à l'asbeste

- Rarement évaluée.
- Seulement études de conjoints en contact avec des travailleurs de l'amiante

1. 2218 contacts (amosite): légère augmentation du risque de CB chez homme (observé vs. attendu = 1,97), mais pas chez la femme (observé vs. attendu = 1,70).
2. 1780 épouses (chrysotile et crocidolite): pas d'augmentation du risque de CB (SMR = 1,17; IC 95%: 0,60–2,04)

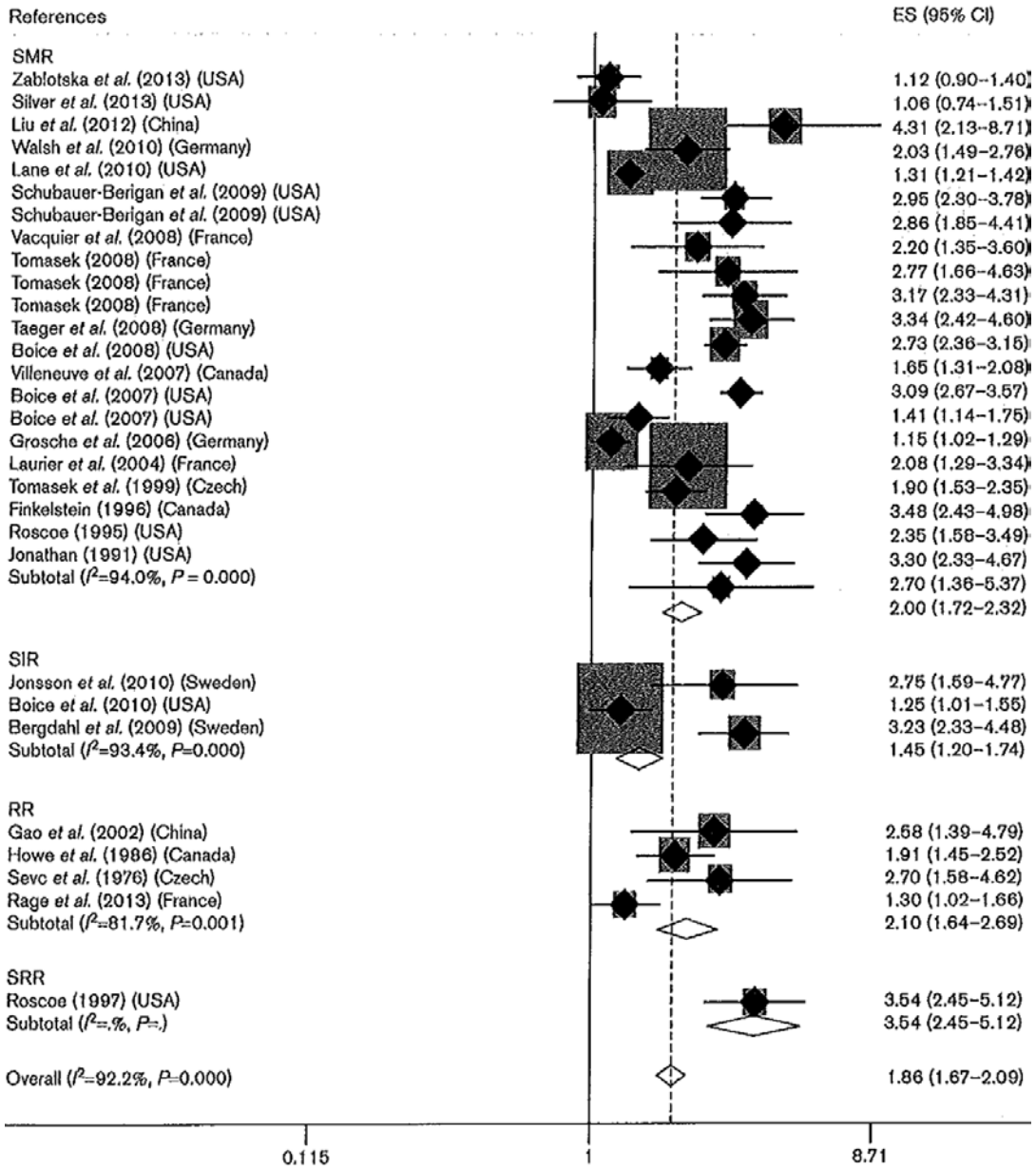


Goswami et al, Int J Environ Res Public Health 2013

Radon

- Premiers cas décrits de cancers respiratoires liés à l'exposition au radon chez mineurs en 1879
- Principale source = inhalation des descendants solides à vie courte (Polonium-218 et 214)
- Exposition domestique: sols (roches granitiques), eau de ruissèlement, ventilation

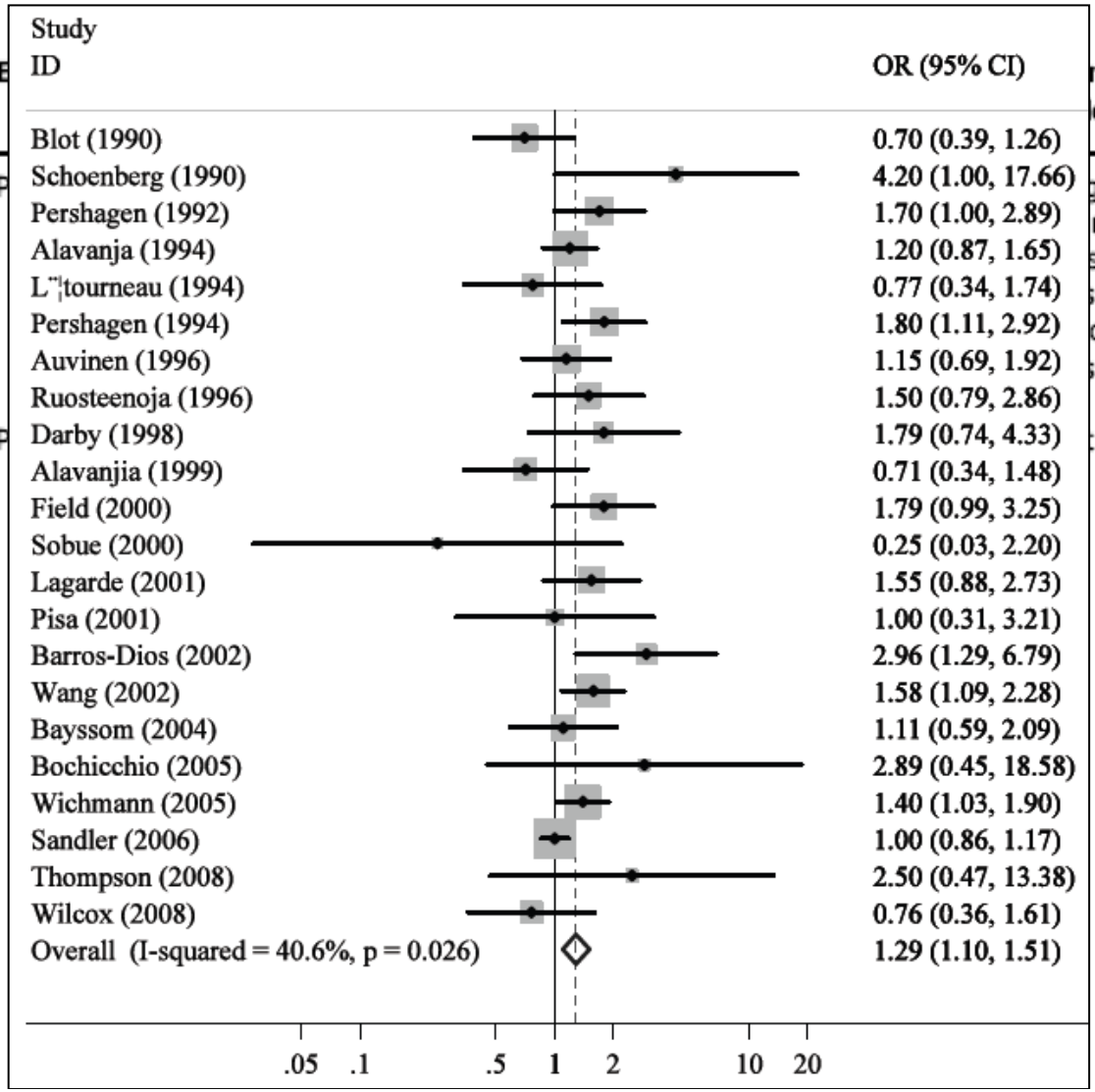
Risque de CB (radon en milieu professionnel)



Duan et al, Eur J cancer Prevention 2015

Risque de CB par exposition au radon (« residential exposure »)

Study	Design/population	E	ment es
Krewski et al. (177)	Meta-analysis: 7 case-control studies with 659 lung cancer cases and 2,185 population controls who "never smoked"; Study location: North America; Publication dates: 1992-2000	P	gender, number sidences, with ck surement:
Darby et al. (178)	Meta-analysis: 13 case-control studies with 884 lung cancer cases and 5,418 controls that were "lifelong nonsmokers";Study location: Europe; Publication dates: 1992–2005	P	ted



Samet et al Clin Cancer Res 2009
Zhang, APJCP 2012

Dose-effet (« residential exposure »)

Darby et al. (179)	Meta-analysis: 13 case-control studies with 884 lung cancer cases and 5,418 controls that were "lifelong nonsmokers";Study location: Europe; Publication dates: 1992–2005	<25 Bq/m^3 cumulative radon exposure during 5–30 years before index (diagnosis or death) date vs.	0 Bq/m^3 cumulative radon exposure during the 5–30 years before index (diagnosis or death) date	1.06 (0.78–1.45)	Study, age, gender, residence location
		25–49 Bq/m^3 cumulative radon exposure during 5–30 years before index (diagnosis or death) date vs.	0 Bq/m^3 cumulative radon exposure during the 5–30 years before index (diagnosis or death) date	1.07 (0.90–1.26)	Study, age, gender, residence location
		50–99 Bq/m^3 cumulative radon exposure during 5–30 years before index (diagnosis or death) date vs.	0 Bq/m^3 cumulative radon exposure during the 5–30 years before index (diagnosis or death) date	1.02 (0.90–1.16)	Study, age, gender, residence location
		100–199 Bq/m^3 cumulative radon exposure during 5–30 years before index (diagnosis or death) date vs.	0 Bq/m^3 cumulative radon exposure during the 5–30 years before index (diagnosis or death) date	1.23 (1.02–1.48)	Study, age, gender, residence location
		200–399 Bq/m^3 cumulative radon exposure during 5–30 years before index (diagnosis or death) date vs.	0 Bq/m^3 cumulative radon exposure during the 5–30 years before index (diagnosis or death) date	1.37 (1.00–1.90)	Study, age, gender, residence location
		≥400 Bq/m^3 cumulative radon exposure during 5–30 years before index (diagnosis or death) date vs.	0 Bq/m^3 cumulative radon exposure during the 5–30 years before index (diagnosis or death) date	1.72 (1.04–2.88)	Study, age, gender, residence location

« The dose-response analysis of the remaining 17 studies showed that the risk of lung cancer increased significantly, on average, by 7% for every 100 Bq/m3 increment in residential radon exposure (OR: 1.07; 95% CI: 1.04-1.10; P for trend<0.001) »

Samet et al Clin Cancer Res 2009
Zhang, APJCP 2012

Quelle est l'importance du risque?

Table 2
Description of the included studies.

Author (year)	Number of never-smoking cases and study design	Exposure time and radon measurement	% Of females	Mean age cases/ controls	Mean or median radon concentration (Bq/m^3)	Excess of relative risk for 100 Bq/m^3	Risk of lung cancer broken down in categories
Turner et al. [16]	271 Cohort	Mean county level radon concentration	Not specified for never smokers	Not specified for never smokers	55.5	HR: 0.77 (95%CI 0.47–125)	Not specified
Krewski et al. [11,20]	659 Pooling study	5–30 years Alpha track	Not specified for never smokers	Not specified for never smokers	Not specified for never smokers	EOR: 0.10 (95%CI −0.09 to 0.42)	Not specified
Darby et al. [10,15]	884 Pooling study	5–34 years Alpha track	69.7	Not specified for	112	ERR: 0.196 (95%CI 0.092–28)	≤25 Bq/m^3: 1.06 (0.78–1.45) 25–49 Bq/m^3: 1.07 (0.90–1.26) 50–99 Bq/m^3: 1.03 (0.92–1.15) 100–199 Bq/m^3: 1.23 (1.02–1.48 200–399 Bq/m^3: 1.37 (1.00–1.90 ≥400 Bq/m^3: 1.72 (1.04–2.88)
Lubin [17]	USA: 359 China: 322 Case-control	5–30 years Alpha					Not specified
Kreuzer et al. [14]	234 Case-control	24 years Alpha tra					Not specified
Kreuzer et al. [13]	58 Case-control	26 years Alpha tra					<50 Bq/m^3: 1.0 50–79 Bq/m^3: 1.3 (0.6–2.6) 80–139 Bq/m^3: 1.5 (0.6–3.5) ≥140 Bq/m^3: 2.0 (0.7–5.8)
Field et al. [21]	56 Case-control	33 years (cases)/ 31 years (controls Alpha track				o 1.93)	Not specified
Wang et al. [18]	209 Case-control	5–30 years Alpha track	87.5	Not specified for never smokers	230.4/222.2	EOR: 0.09 (p = 0.39)	Not specified
Lagarde et al. [12]	436 Case-control	32 years Alpha track	55.8	68.0/68.0	86/79	ERR: 0.10 (95%CI −0.04 to 0.38)	<50 Bq/m^3: 1.0 50–80 Bq/m^3: 1.1 (0.8–1.5) 81–139 Bq/m^3: 1.2 (0.9–1.6) ≥140 Bq/m^3: 1.4 (1.0–2.1)
Pershagen et al. [24]	178 Case-control	32.5 years Alpha track	86/79	Not specified for never smokers	106.5	ERR: 0.07 (...–0.35)	≤50 Bq/m^3: 1.0 51–80 Bq/m^3: 1.1 (0.7–1.7) 81–140 Bq/m^3: 1 (0.6–1.5) 141–400 Bq/m^3: 1.5 (1.0–2.3) >400 Bq/m^3: 1.2 (0.4–3.1)
Alavanja et al. [22]	377 Case-control	30 years Alpha track	100	71.0/69.5	67/34	No association	<30 Bq/m^3: 1 30–44 Bq/m^3: 1.3 45–62.5 Bq/m^3: 0.90 62.5–90 Bq/m^3: 0.91 90–566 Bq/m^3: 1.20
Schoenberg et al. [23]	61 Case-control	26 years (cases) 27 years (controls) Alpha track	100	Not specified for never smokers	Not specified for never smokers	No association p = 0.39	<38 Bq/m^3: 1 38–70 Bq/m^3: 0.9 71–418 Bq/m^3: 1.2

Risque attribuable variable

Torres-Duran et al, Cancer Letters 2014

Table 1 Percentage of lung cancer deaths attributable to indoor radon according to smoking status and gender

Country (reference)	Mean indoor radon (Bq/m^3)	Model used in risk estimation	Ever-smokers			Never-smokers			Ever- and never-smokers		
			Male	Female	Total	Male	Female	Total	Male	Female	Total
United States											
([2], 1999)	46	BEIR VI, EAC	12.5	13.7	12.9	25.8	26.9	26.4	14.1	15.3	13.9
		BEIR VI, EAD	8.7	9.6	9.1	18.9	19.7	19.1	9.9	10.8	9.8
Netherlands											
([18], 2001)	23	Two-mutation carcinogenesis model	-	-	-	-	-	-	2	6	4
Sweden											
([18], 2001)	110	Two-mutation carcinogenesis model	-	-	-	-	-	-	17	24	20
Canada											
([15], 2005)	28	BEIR VI, EAC	-	-	7.3	-	-	13.5	-	-	7.8
([1], 2012)	42	EPA model	15.3	14.3	14.8	29.5	27.8	28.4	16	16	16
([17], 2013)	43	BEIR VI, EAC	-	-	12.3	-	-	21.9	-	-	13.6
France											
([16], 2006)	89	BEIR VI, EAC	-	-	11	-	-	50	-	-	13
		BEIR VI, EAD	-	-	8	-	-	36	-	-	9
		European pooling study	-	-	-	-	-	-	-	-	5
Germany											
([14], 2008)	49	European pooling study	5.0	5.2	-	5.2	5.2	-	-	-	5.0
Switzerland											
([14], 2008)	78	European pooling study	8.2	8.6	-	8.8	8.8	-	-	-	8.3
United Kingdom											
([20], 2009)	21	BEIR VI, EAC	-	-	-	-	-	-	-	-	6.0
		European pooling study	-	-	-	-	-	-	-	-	3.3
Portugal											
([21], 2012)	81	BEIR VI, EAC	25	23	-	40	38	-	27	34	-
		BEIR VI, EAD	18	17	-	31	29	-	20	27	-
South Korea											
([19], 2015)	62	BEIR VI, EAC	18.6	18.5	-	33.2	32.8	-	19.5	28.2	-
		BEIR VI, EAD	-	-	-	-	-	-	13.5	20.4	-
		European pooling study	-	-	-		-	-	8.3	8.3	-

Risque de CB attribuable au radon 3-20%

Kim et al, Ann Occup Environ Med 2016

Table 2 Number of radon-attributable lung cancer deaths per year according to smoking status and gender

Country (reference)	Mean indoor radon (Bq/m^3)	Model used in risk estimation	Ever-smokers			Never-smokers			Ever- and never-smokers		
			Male	Female	Total	Male	Female	Total	Male	Female	Total
United States											
([2], 1999)	46	BEIR VI, EAC	11300	7600	18900	1200	1700	2900	12500	9300	21800
		BEIR VI, EAD	7900	5400	13300	900	1200	2100	8800	6600	15400
Netherlands											
([18], 2001)	23	Two-mutation carcinogenesis model	-	-	-	-	-	-	90	60	150
Sweden											
([18], 2001)	110	Two-mutation carcinogenesis model	-	-	-	-	-	-	242	178	420
Canada											
([15], 2005)	28	BEIR VI, EAC	-	-	-	-	-	-	-	-	1400
([1], 2012)	42	EPA model	1639	1198	2837	166	258	424	1805	1456	3261
([17], 2013)	43	BEIR VI, EAC	-	-	708	-	-	139	-	-	847
France											
([16], 2006)	89	BEIR VI, EAC	-	-	2578	-	-	759	-	-	3337
		BEIR VI, EAD	-	-	1819	-	-	541	-	-	2361
		European pooling study	-	-	-	-	-	-	-	-	1234
Germany											
([14], 2008)	49	European pooling study	1390	347	1737	32	127	159	1422	474	1896
Switzerland											
([14], 2008)	78	European pooling study	164	54	218	5	8	13	169	62	231
United Kingdom											
([20], 2009)	21	BEIR VI, EAC	-	-	-	-	-	-	1156	888	2044
		European pooling study	-	-	-	-	-	-	637	473	1100
Portugal											
([21], 2012)	81	BEIR VI, EAC	1627	308	1935	143	60	203	1769	369	2138
		BEIR VI, EAD	1183	226	1409	111	46	157	1294	271	1565
South Korea											
([19], 2015)	62	BEIR VI, EAC	-	-	-	-	-	-	26782	13695	40477
		BEIR VI, EAD	-	-	-	-	-	-	18614	9947	28561
		European pooling study	-	-	-	-	-	-	11906	4271	16177

Nombre de décès par CB lié au radon chez non-fumeur 13-2900/an

Kim et al, Ann Occup Environ Med 2016

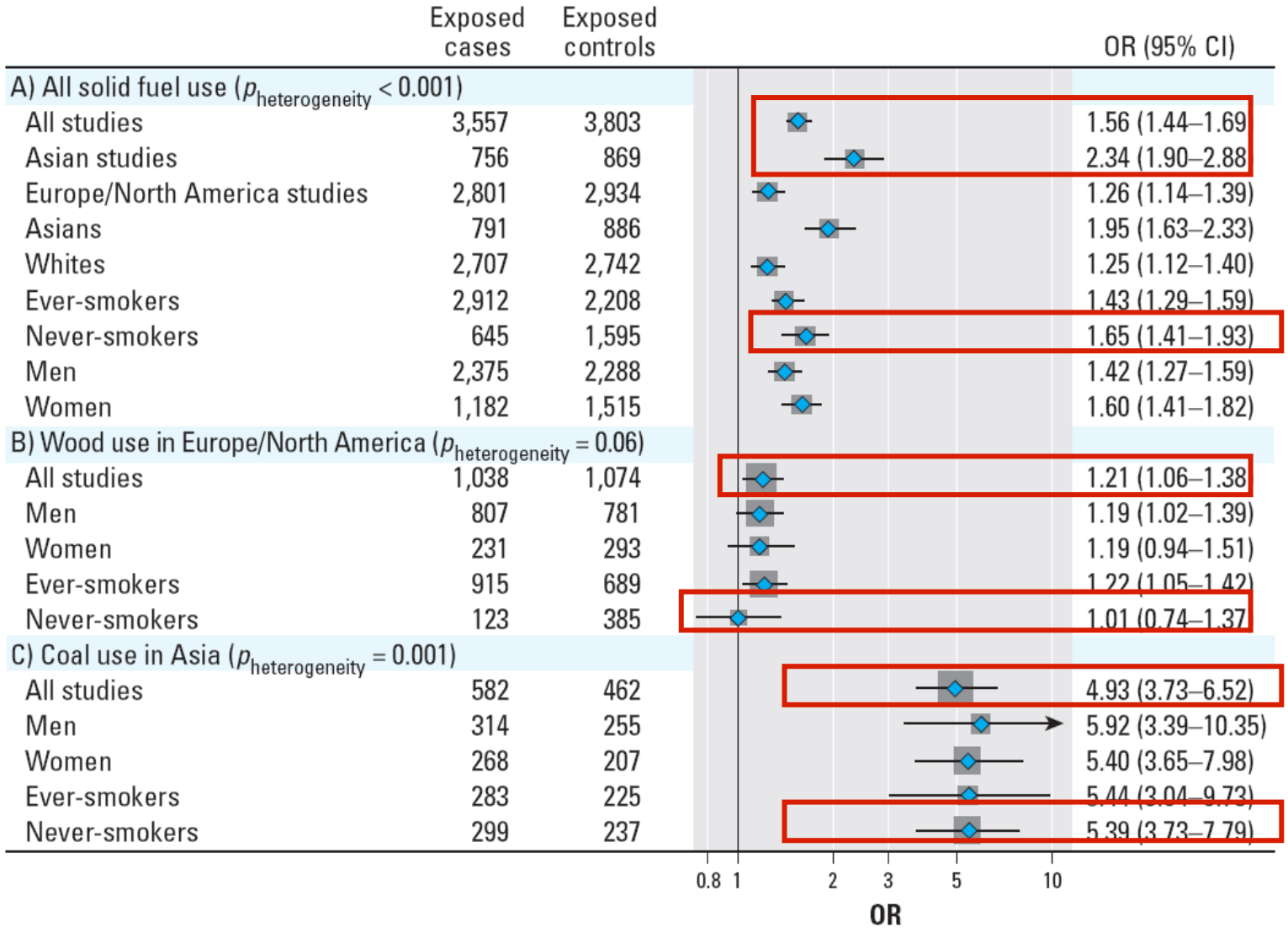
Irradiation médicale

Study	Design/population	Exposure group	Reference group	Risk estimate (95% CI)
Neugut et al. (173)	Case-control:16 female lung cancer cases among breast cancer survivors (nonsmokers); 348 female breast cancer survivor controls (nonsmokers); Study location: CT;Study years: 1986–1989	Received radiation therapy for breast cancer vs.	Did not receive radiation therapy for breast cancer	3.2 (0.6–17.4)
van Leeuwen et al. (175)	Case-control:From a cohort of 1,939 Hodgkin's disease patients:8 male and female lung cancer cases (nonsmokers);33 male and female controls (nonsmokers);Study location: The Netherlands; Study years: 1966–1986	Received 1–5 Gy radiation therapy for Hodgkin's disease vs.	Received <1 Gy radiation therapy for Hodgkin's disease	0.99 (0.07–14.7)
		Received ≥5 Gy radiation therapy for Hodgkin's disease vs.	Received <1 Gy radiation therapy for Hodgkin's disease	2.5 (0.21–29.4) P_{trend} = 0.43
Hu et al. (144)	Case-control:161 female lung cancer cases (never smokers);483 female population controls;Study location: Canada;Study years: 1994–1997	Occupational radiation sources vs.	No occupational exposure to radiation sources	2.1 (0.7–6.8)
Ford et al. (186)	Case–control:41 female lung cancer cases among breast cancer survivors (never smokers);159 female breast cancer survivor controls (never smokers);Study location: TX;Study years: 1960–1997	Received radiation therapy for breast cancer vs.	Did not receive radiation therapy for breast cancer	0.60
Boffetta et al. (187)	Case–control:209 male and female lung cancer cases (never smokers);976 male and female hospital and population controls (never smokers);Study location: Czech Republic, Hungary, Poland, Romania, Russia, Slovakia;Study years: 1998–2002	1–30 occupational X-ray examinations vs.	No occupational X-ray examinations	1.22 (0.73–2.03)
		>30 occupational X-ray examinations vs.	No occupational X-ray examinations	2.30 (1.15–4.57)
Prochazka et al. (174)	Case series:82 women diagnosed with breast cancer and then subsequent lung cancer (nonsmokers); Study location: Sweden; Study years: 1958–2000	Received ipsilateral radiation therapy for breast cancer (breast and lung cancer on same side) vs.	Contralateral radiation dose to lung ≤15% of the ipsilateral dose (lung on opposite side of breast cancer served as control)	0.9 (0.37–2.22)

- Relation incertaine avec cancer bronchique
- Probable effet additif (multiplicatif?) avec tabac

Samet et al Clin Cancer Res 2009

Pollution au domicile



Hosgood et al Environmental Health Perspectives 2010

Pollution atmosphérique
Etudes chez le non-fumeur

Study	Design/population	Exposure Group		Reference Group	Risk Estimate (95% CI)
Nyberg *et al.* (2000) (S64)	Case-control: 36 male lung cancer cases (never smokers) 705 male population controls (never smokers) Study location: Sweden (Stockholm) Study years: 1985-1990 for case and control selection; 1994-1996 [illegible] collection of exposu[illegible] with air poll[illegible] from 19[illegible]	Exposure to >29.3μg/m^3 NO_2 from road traffic	vs.	Exp[illegible] NO_2	1.68 (0.67-4.19)
Pope *et al.* (2002) (S)	Cohort s[illegible] 359,000 [illegible] cohort mel[illegible] never smokers no[illegible] Number of lung cancer cases not stated Study location: USA (51 cities) Study years: 1979-1983	[illegible] 10μg/m^3 increase in $PM_{2.5}$ concentration	vs.	Not exposed to $PM_{2.5}$ (not defined)	1.14 (0.94-1.39)

Rôle non établi

Biais méthodologiques/facteurs confondants

Samet et al Clin Cancer Res 2009

Diesel Exhaust Exposure and the Risk of Lung Cancer—A Review of th

Yi Sun *, Frank B

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Parameter	Estimate	SE	*p*-Value
Intercept	0.08813	0.1176	0.48
Slope (β) (lnRR per μg/m³-years)	0.000982	0.000219	0.002

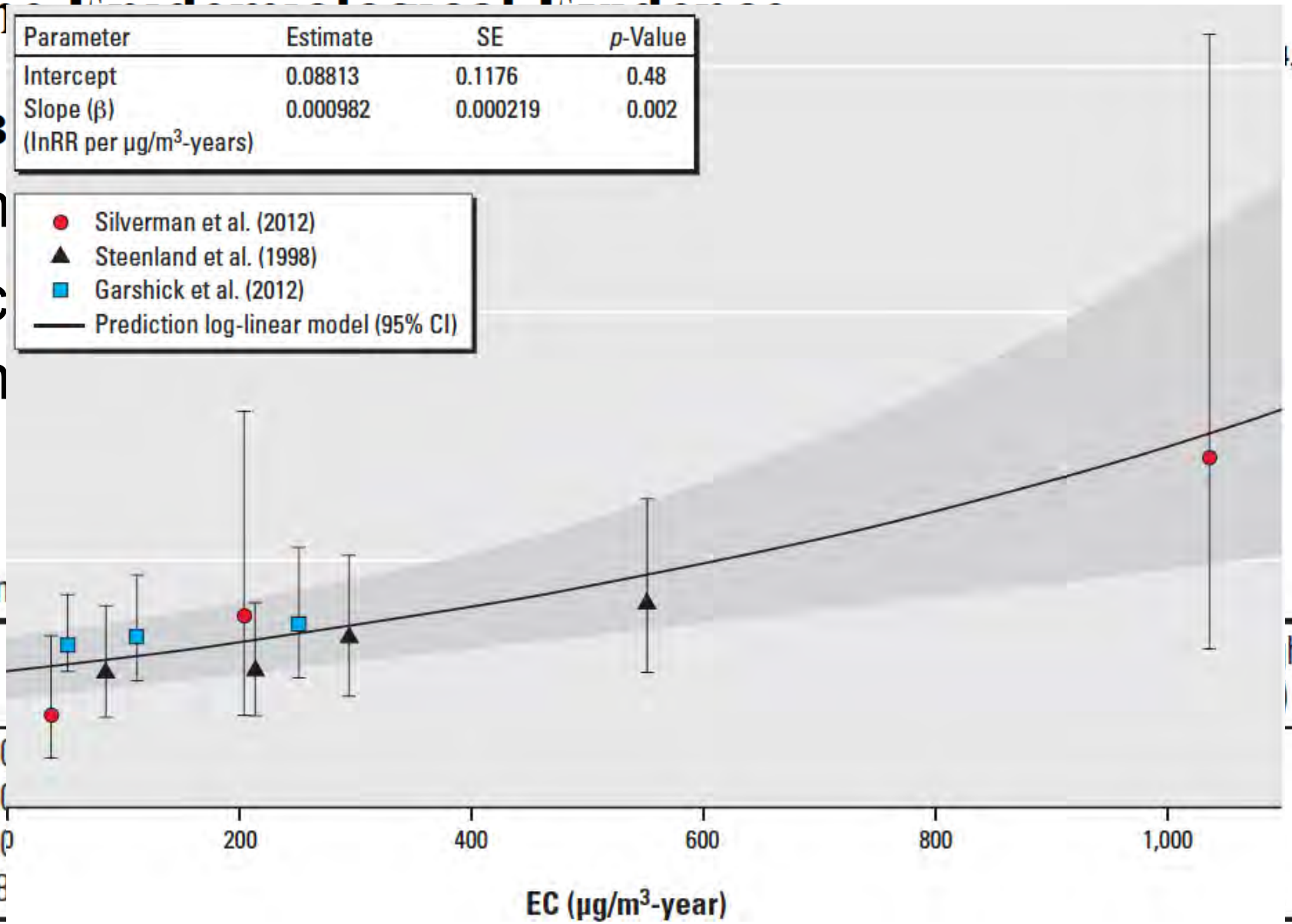


Table 2. Excess lifetin

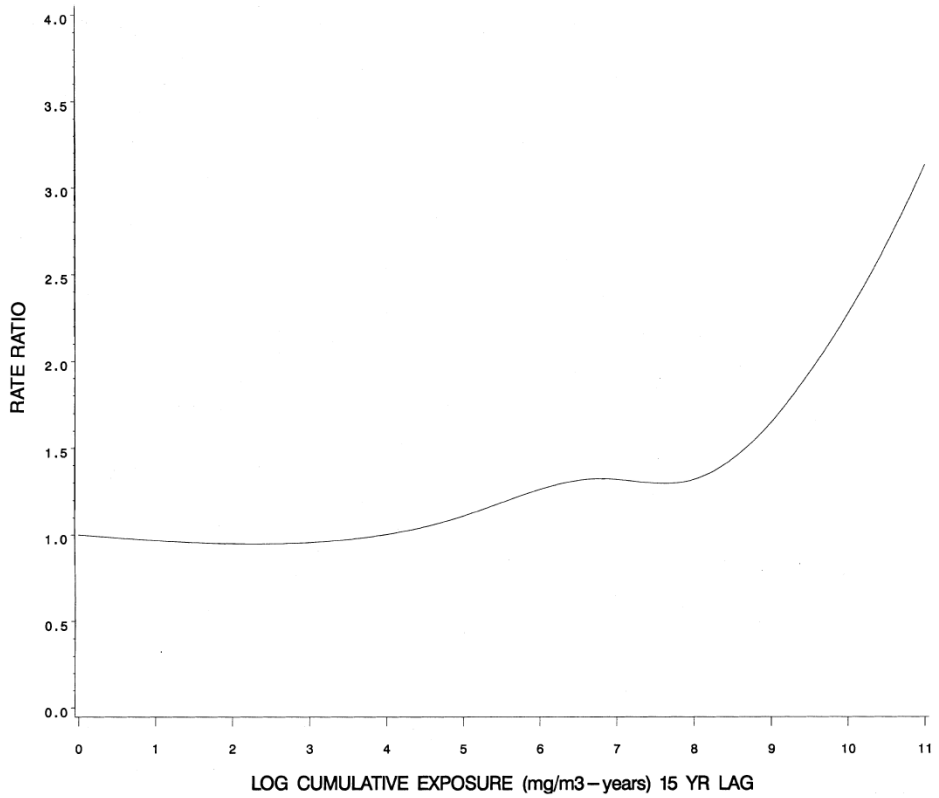
Exposure setting
Worker exposed, age 2(
Worker exposed, age 2(
Worker exposed, age 2(
General public, age 5–8

h

Vermeulen et al, Environ Health Perspective 2014

Silicates

Study	SMR lung, 95% CI
US diatomaceous [17]	1.3 (1.0–1.6)
Finnish granite [12]	1.4 (1.0–2.0)
US granite [16]	1.2 (1.0–1.3)
US industrial sand [14]	1.6 (1.2–1.9)
China pottery [13]	1.1 (0.84–1.4)
China tin [13]	2.1 (1.7–2.6)
China tungsten [13]	0.63 (0.53–0.75)
South Africa gold [20]	n.a.[a]
US gold [11]	1.2 (1.0–1.4)
Australia gold [15]	1.8 (1.5–2.1)
Total	1.2 (1.1–1.3)



Steenland et al Cancer Causes Control 2001

Study	Design/population	Exposure Group		Reference Group	Risk Estimate (95% CI)
Occupational silica exposure:					
Forastiere *et al.* (1986) (S45)	Case-control: 72 male deaths due to cancer of the lung, bronchus, or trachea (10 nonsmokers) 319 deceased male population controls (85 nonsmokers) Study location: Italy (Civitacastellana) Study years: 1968-1984	Ceramic worker or quarryman (all ages)	vs.	Not a ceramic worker or quarryman (all ages)	1.22
		Ceramic workers (all ages)	vs.	Not a ceramic worker or quarryman (all ages)	1.33
		Ceramic workers that did not make compensation claims for silicosis (all ages)	vs.	Not a ceramic worker or quarryman (all ages)	1.95
		Ceramic worker or quarryman (<65 years old)	vs.	Not a ceramic worker or quarryman (<65 years old)	0.72
		Ceramic workers (<65 years old)	vs.	Not a ceramic worker or quarryman (<65 years old)	0.81
		Ceramic workers that did not make compensation claims for silicosis (<65 years old)	vs.	Not a ceramic worker or quarryman (<65 years old)	1.30
		Ceramic worker or quarryman (≥65 years old)	vs.	Not a ceramic worker or quarryman (≥65 years old)	1.73
		Ceramic workers (≥65 years old)	vs.	Not a ceramic worker or quarryman (≥65 years old)	1.86
		Ceramic workers that did not make compensation claims for silicosis (≥65 years old)	vs.	Not a ceramic worker or quarryman (≥65 years old)	2.60
Mastrangelo *et al.* (1988) (S46)	Case-control: 309 male lung cancer cases (6 never smokers) 309 male hospital controls (44 never smokers) Study location: Italy (Belluno) Study years: 1973-1980	Exposed to silica, not compensated for silicosis (never smokers)	vs.	Not exposed to silica (never smokers)	1.3 (0.0-13.8)
		Exposed to silica, compensated for silicosis (never smokers)	vs.	Not exposed to silica (never smokers)	5.3 (0.5-43.5)
Siemiatycki *et al.* (1990) (S47)	Case-control: 5 male non-adenocarcinoma lung cancer cases (never smokers) 1523 male hospital controls (number of never smokers not stated)	Substantial silica exposure (cumulative silica exposure greater than the mean cumulative exposure among the exposed, never smokers)	vs.	Not exposed to silica (never smokers)	
Wu-Williams *et al.* (1993) (S25)	Case-control: 966 female lung cancer cases (number of nonsmokers not stated) 960 female population controls (number of nonsmokers not stated) Study location: China (Harbin and Shenyang) Study years: 1985-1987	Occupational exposure to silica dust (nonsmokers, 43 cases/71 controls)	vs.	No occupational exposure to silica dust (nonsmokers)	0.9
Zeka *et al.* (2006) (S48)	Case-control: 223 male and female lung cancer cases (never-smokers) 1039 male and female hospital and population controls (never smokers) Study location: Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, UK Study years: 1998-2002	Ever occupational exposure to silica	vs.	Never occupational exposure to silica	1.76 (0.97-3.21)
		>0 to 8 years of occupational exposure to silica	vs.	Never occupational exposure to silica	1.20 (0.49-2.92)
		>8 years of occupational exposure to silica	vs.	Never occupational exposure to silica	2.39 (1.11-5.15)
		>0 to 42.1 cumulative exposure index (intensity-frequency-years) of occupational silica exposure	vs.	Never occupational exposure to silica	1.11 (1.43-2.88)
		>42.1 cumulative index of occupational silica exposure	vs.	Never occupational exposure to silica	2.45 (1.15-5.20)
Studies of silicotics:					
Zambon *et al.* (1987) (S49)	Cohort: 1313 male workers compensated for silicosis during the period 1959-1963 (161 never smokers) 70 lung cancer deaths (8 never	Observed number of lung cancer deaths of men in cohort with 10-19 years of silicotics exposure	vs.	Expected number of male lung cancer deaths in the Veneto region of Italy	52 (1-292)
		Observed number of lung	vs.	Expected number of male lung	338 (70-987)

Etudes chez non-fumeur

RR 1,6-2,2

Chiyotani et al. (1990) (S50)	Cohort: 3335 men with pneumoconiosis (number of never smokers not stated) 60 lung cancer deaths (4 never smokers) Study location: Japan Study years: 1979-1983	Observed number of lung cancer deaths among men in cohort (never smokers)	vs.	Expected n cancer deat general Jap	1.30 (0.03-7.22)
Hessel *et al.* (1990) (S51)	Case-control: 231 white gold miners with lung cancer (gender and number of nonsmokers not stated) 318 white gold miner controls (gender and number of nonsmokers not stated) Study location: South Africa Study years: >1983 (specific dates not stated)	Silicosis of the hilar glands (nonsmokers)	vs.	No silicosis of the hilar glands (nonsmokers)	1.12
		Silicosis of the parenchyma (nonsmokers)	vs.	No silicosis of the parenchyma (nonsmokers)	1.62
		Silicosis of the pleura (nonsmokers)	vs.	No silicosis of the pleura (nonsmokers)	1.37
Amandus and Costello (1991) (S52)	Cohort: 9912 male metal miners (1802 never smokers) 132 lung cancer deaths (6 never smokers) Study location: USA Study years: 1959-1975	Observed number of lung cancer deaths among silicotic men in cohort (never smokers)	vs.	Expected number of male lung cancer deaths in the general U.S. population	0.53 (0.01-2.95)
		Rate of lung cancer death among silicotic cohort members (never smokers)	vs.	Rate of lung cancer death among nonsilicotic cohort members (never smokers)	3.77 (1.03-13.78)
Amandus *et al.* (1991) (S53)	Cohort: 760 males diagnosed with silicosis (137 never smokers) 34 deaths due to cancer of the lung, trachea, or bronchus (5 never smokers) Study location: USA (NC) Study years: 1940-1983	Observed number of lung cancer deaths among men in cohort with silicosis diagnosed while employed in a dusty trade (mining, foundries, quarrying, stone crushing, asbestos and silica manufacturing, construction), never smokers	vs.	Expected number lung cancer deaths in the general U.S. population	2.0 (0.6-4.6)
Carta *et al.* (1991) (S54)	Cohort: 724 males diagnosed with silicosis between 1964 and 1970 (number of never smokers not stated) 22 lung cancer deaths (4 never smokers) Study location: Italy (Sardinia)	Observed number of deaths due to lung cancer among men in cohort (never smokers)	vs.	Expected number of male lung cancer deaths in the Sardinian region or Italy	0.69 (0.3-1.8)
	Study location: Singapore Study years: 1970-1984				
Partanen *et al.* (1994) Finland (S56)	Cohort: 811 males diagnosed with silicosis between 1936 and 1977 (number of never smokers not stated) 41 cases of lung cancer (1 never smoker) Study location: Finland Study years: 1983-1991	Observed incidence of lung cancer among men in cohort (never smokers)	vs.	Expected incidence of lung cancer among men in the general Finnish population	0.44 (0.01-2.43)
Dong *et al.*(1995) (S57)	Cohort: 6266 male silica and clay brick workers employed before 1962 (number of nonsmokers not stated) 65 deaths due to lung cancer (19 nonsmokers) Study location: China Study years: 1963-1985	Observed number of lung cancer deaths among men in cohort (nonsmokers)	vs.	Expected number of lung cancer deaths among 11470 male steel workers (nonsmokers)	1.37
		Observed number of lung cancer deaths among men in cohort diagnosed with silicosis (nonsmokers)	vs.	Expected number of lung cancer deaths among 11470 male steel workers (nonsmokers)	2.13
		Observed number of lung cancer deaths among men in cohort not diagnosed with silicosis (nonsmokers)	vs.	Expected number of lung cancer deaths among 11470 male steel workers (nonsmokers)	0.85
Wang *et al.*(1996) (S58)	Cohort: 4372 males employed in metallurgical mines or plants before 1980 (number of nonsmokers not stated) 104 lung cancer deaths (32 nonsmokers) Study location: China Study years: 1980-1989	Observed number of lung cancer deaths among me in cohort (nonsmokers)	vs.	Expected number of lung cancer deaths in the general population (not further defined)	209

Samet et al Clin Cancer Res 2009

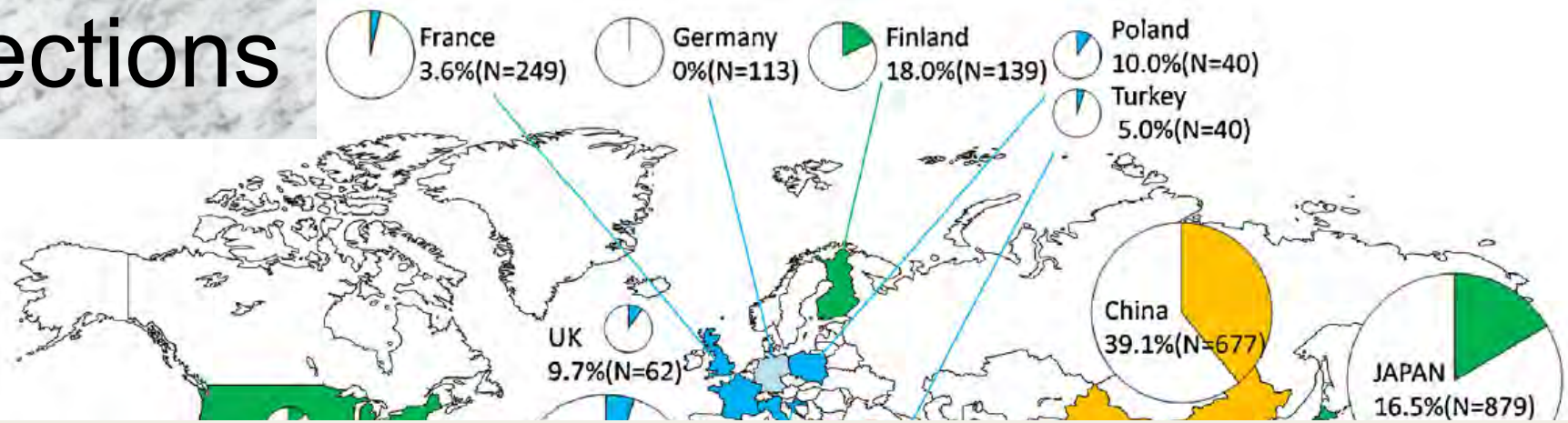
Table 2. Carcinogenetic agents related with development of lung cancer according to IARC (first column: with sufficient evidence in humans; second: with limited evidence).

1. Aluminum production	1. Acid mists, strong inorganic
2. Arsenic and inorganic arsenic compounds	2. Art glass, glass containers and pressed ware (manufacture of)
3. Asbestos (all forms)	
4. Beryllium and beryllium compounds	
5. Bis (chloromethyl) ether; chloromethyl methyl ether (technical grade)	3. Biomass fuel (primarily wood),indoor emissions from household combustion of
6. Cadmium and cadmium compounds	
7. Chromium(VI) compounds	4. Bitumens, occupational exposure to oxidized bitumens and their emissions during roofing
8. Coal, indoor emissions from household combustion	
9. Coal gasification	
10. Coal-tar pitch	5. Bitumens, occupational exposure to hard bitumens and their emissions during mastic asphalt work
11. Coke production	
12. Engine exhaust, diesel	
13. Hematite mining (underground)	
14. Iron and steel founding	6. Carbon electrode manufacture
15. MOPP (vincristine-prednisone-nitrogen mustard-procarbazine mixture)	7. alpha-Chlorinated toluenes and benzoyl chloride (combined exposures)
16. Nickel compounds	
17. Painting	8. Cobalt metal with tungsten carbide
18. Plutonium	
19. Radon-222 and its decay products	9. Creosotes
20. Rubber production industry	10. Frying, emissions from hightemperature
21. Silica dust, crystalline	11. Insecticides, non-arsenical (occupational exposures in spraying and application)
22. Soot	
23. Sulfur mustard	
24. Tobacco smoke, secondhand	12. Printing processes
25. Tobacco smoking	13. 2,3,7,8-Tetrachlorodibenzopara-dioxin
26. X-radiation, gamma-radiation	
	14. Welding fumes

Carcinogènes (selon IARC) impliqués dans les CB

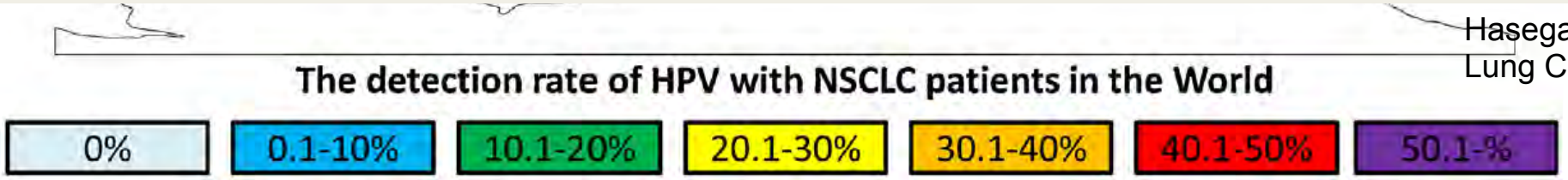
Spyratos et al, J Thorac Dis 2013

Infections



- HPV6, HPV16 et HPV18 ont été trouvés dans CB, plutôt chez fumeur
- HIV associé à augmentation prévalence CB

- Données épidémiologiques insuffisantes pour conclure chez le non-fumeur



Hasegawa et al, Lung Cancer 2014

Maladies pulmonaires chroniques

Tuberculose

Study	Design/population	Exposure group		Reference group	Risk estimate (95% CI)
Hinds et al. (166)	Case-control: 211 female lung cancer cases (never smokers); 419 female population controls (never smokers); Study location: HI;Study years: 1968–1978	History of pulmonary tuberculosis infection	vs.	No history of pulmonary tuberculosis infection	8.2 (1.3–54.4)
Zheng et al. (165)	Case-control: 415 male and female lung cancer cases (never smokers); 714 male and female population controls (never smokers);Study location: Shanghai, China;Study years: 1984–1986	Diagnosed with tuberculosis <20 years ago	vs.	Never diagnosed with tuberculosis	3.5 (1.5–8.0)
		Diagnosed with tuberculosis ≥20 years ago	vs.	Never diagnosed with tuberculosis	1.0 (0.7–1.5)

Samet et al Clin Cancer Res 2009

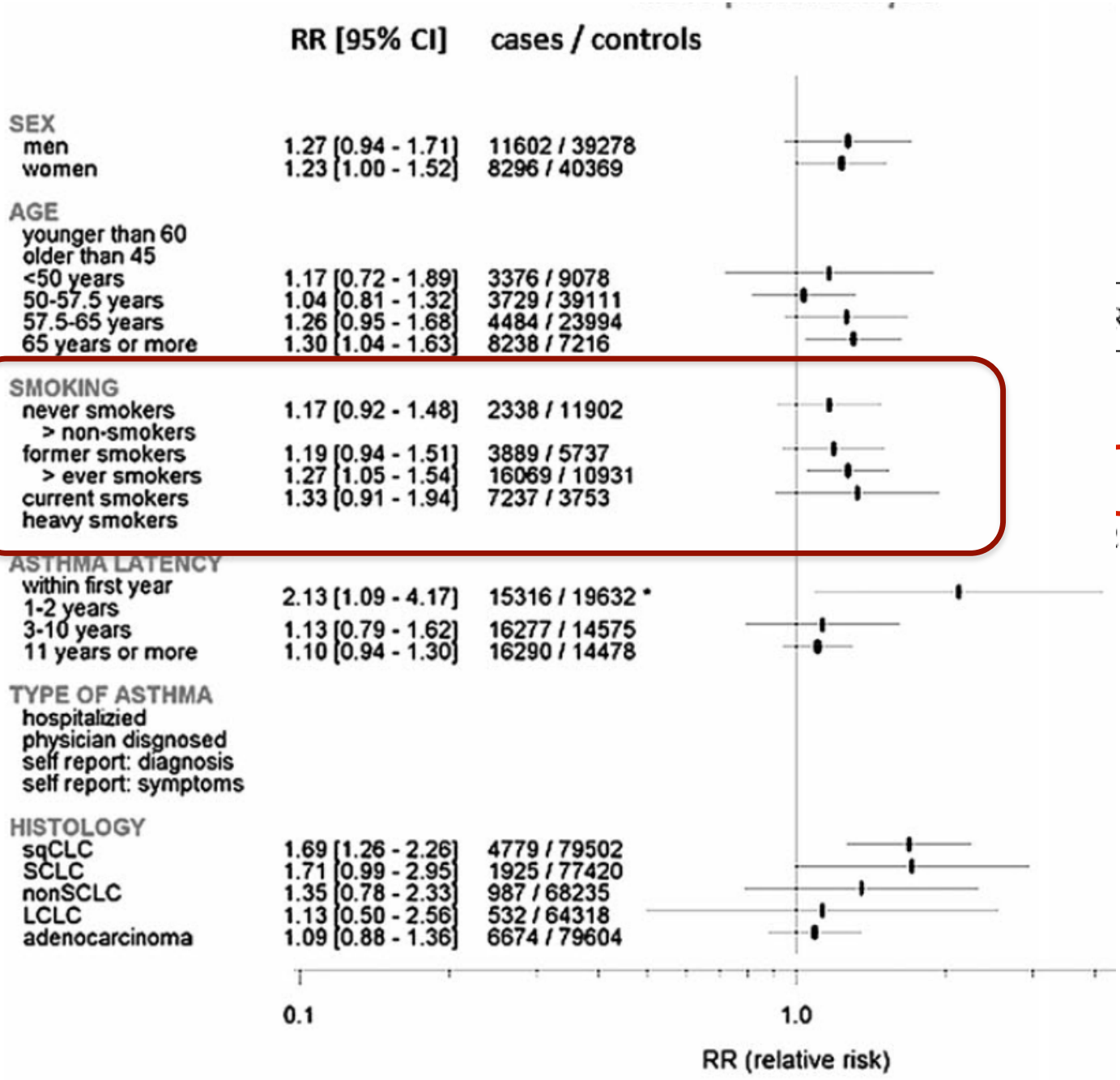
BPCO- Emphysème

Characteristic	Smoking status			P^a Value
	Smokers	Non-smokers	Not identified	
COPD	3.13(2.02,4.86)	1.40(0.83,2.35)	2.92(1.62,5.25)	<.001
Emphysema	3.27(2.72,3.92)	1.69(1.15,2.46)	3.82(2.51,5.81)	<.001
Chronic bronchitis	2.38(1.45,3.92)	1.54(1.24,1.93)	1.98(1.38,2.83)	<.001
Asthma	0.65(0.29,1.45)	1.53(0.89,2.64)	0.93(0.32,2.71)	<.001

Wang et al, Plos One 2012

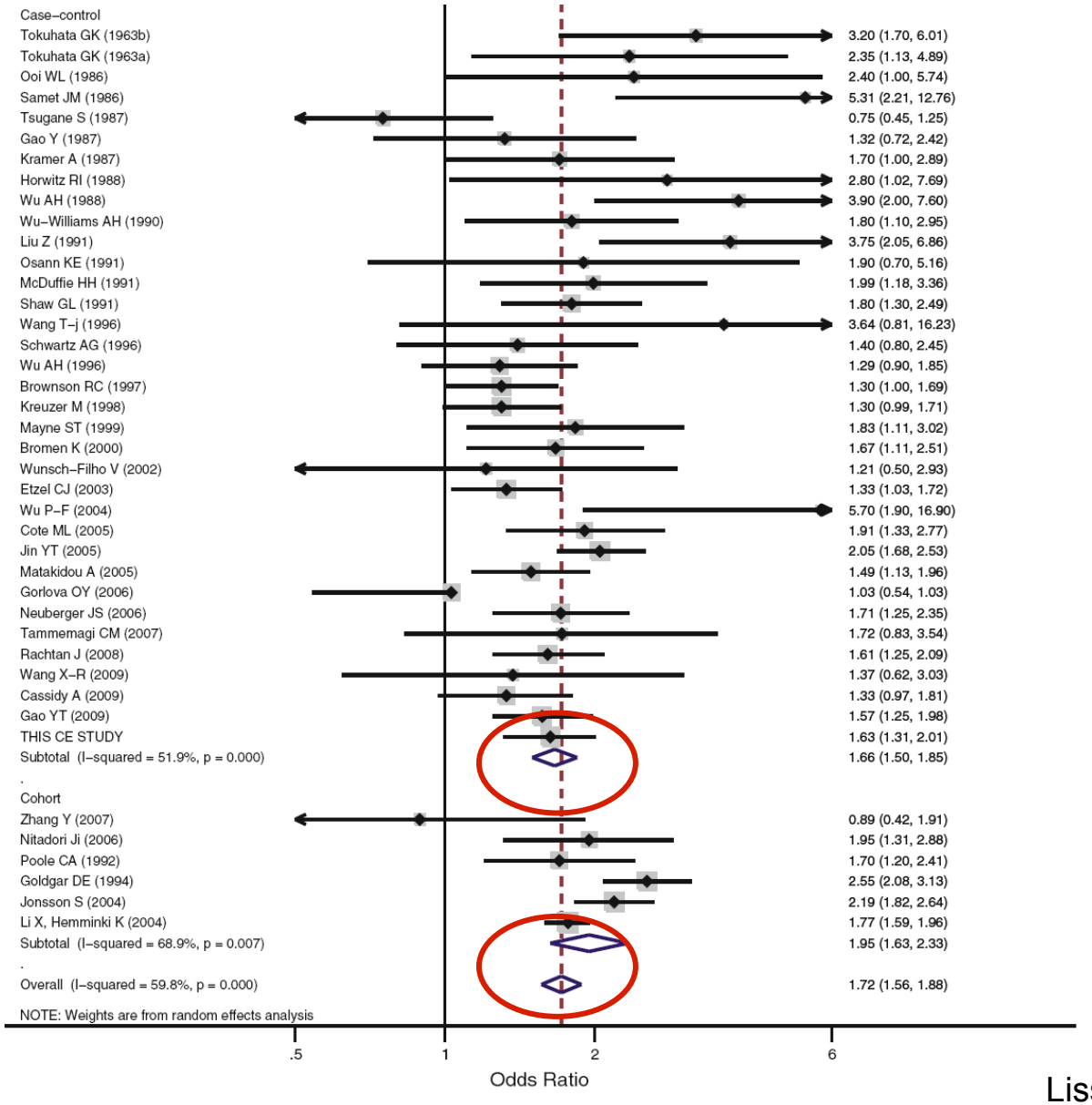
Table 3. Meta-anal

	RR	95% CI
Never smokers [10–	.8	1.3–2.3
Never and former s	.8	1.4–2.3
Controlled for smo	.7	1.3–2.2
Case–control studie	.6	1.3–1.9
Cohort studies [25–	.0	1.3–2.9
Not controlled for s	.4	1.2–1.6



Santillan et al Cancer Causes Control 2003
Rosenberger et al, Carcinogenesis 2012

Histoire familiale



Possible rôle d'un polymorphisme génétique sur la susceptibilité à ETS

Okazaki et al, Anticancer Res 2014

Lissowska Cancer Causes Control 2010

Principal genomic polymorphisms associated with a risk of lung cancer in never smokers.

Pathway	Gene	Protein	Studied polymorphism	OR (95% confidence interval)	Comments
Carcinogenic metabolism (polycyclic aromatic hydrocarbons, nitroaromatics, arylamines)	*CYP1A1*	Enzyme involved in early (phase 1) metabolism steps	T3801C (MspI) A2455G (Ile462Val)	NS 2.21 [1.12–4.37]	Role in hormone-dependent cancers?
	GSTM1	Enzyme involved in late (phase 2) metabolism steps (conjugation)	Null genotype	NS	If associated with the Ile462Val polymorphism of *CYP1A1*, OR= 4.67 [2.00-10.9]. Role in cancers before the age of 50?
	NQO1	Phase 1 and 2 enzyme	Pro187Ser	NS	
DNA repair	*XRCC1*	DNA base repair enzyme	Arg399Gln	2.4 [1.2–5.0]	Protective factor in 'heavy' smokers (relation dose / odds ratio) Expression differential increased in the presence of *ERCC2* Asp312Asn and Lys751Gln polymorphisms
	ERCC2 (*XPD*)	Nucleotide repair enzyme	Lys751Gln and Asp312Asn	NS	
	MLH1	Mismatch repair enzyme	GG Genotype	1.64 [1.10–2.44]	Role in cancers caused by exposure to environmental tobacco smoke?
Inflammation pathways	*IL10*	Inflammation mediator	TT genotype of rs1800871	2.5 [1.3–5.1]	
	TNF		CC genotype of rs1799964	0.36 [0.17–0.77]	
	IL1-β-31T/C		TT genotype	2.24 [1.15–4.38]	If associated with atopy, asthma, chronic cough
	IL1-RN		Allele *2 VNTR	5.09 [1.39–18.67]	
	IL6		Allele 634 G	1.44 [1.07–1.94]	

Couraud et al Eur J Cancer 2012

Table 1 Genetic susceptibility and lung cancer in nerver smokers

Author/year	Region	No. of pts.	Histologic type	Genetic markers
McKay JD et al. 2008 [20]	France	3259 case 4159 control	adenocarcinoma	CLPTM1L-TERT
Hsiung CA et al. 2010 [21]	Taiwan	584 case 585 control	adenocarcinoma	CLPTM1L-TERT
Iwamoto S et al. 2014 [22]	Japan	341	NSCLC	EPAS1
Kang HG et al. 2014 [23]	Korea	360	lung cancer	CSF1R, TP63, CIR1
Shen L et al. 2014 [24]	China	1003	adenocarcinoma	ATM
Yongjun Zhang MM et al. 2013 [25]	China	400	NSCLC	TGM5, PPAP2B, PSMA4
Sun Z et al. 2014 [26]	USA	27	adenocarcinoma	EGFR, TP53, KRAS, RPS6KB2, ATXN2, DHX9, PTPN13, SP1, SPTAN1, MYOF
Bennett WP et al. 1999 [27]	USA	106	lung cancer	GSTM1
Ahn MJ et al. 2012 [28]	Korea	446	NSCLC	APCDD1, NAPG, FAM38B
Lim WY et al. 2011 [29]	Singapore	433		IL6, cyclooxygenase-2, PPAR-γ, IL1RN
Li Y et al. 2010 [30]	USA	1489	lung cancer	13q31.3 GPC5
Wu X et al. 2013 [31]	USA	1583	NSCLC	LEMD3, TMBIM, ATXN7L2, SHE, ITIH2, NUDT5
Zhou W et al. 2003 [32]	USA	1091	lung cancer	XRCC1, ERCC2
Hung RJ et al. 2003 [33]	France	302 case 1631 control	lung cancer	CYP1A1, GSTM1
Liu L et al. 2014 [34]	China	298 case 599 control	lung cancer	GPC5

Choi et al, Ann Occup Environ Med 2016

En pratique en France

TABLE 2 Definite exposure to occupational carcinogens (by task) according to sex

	Men	Women	p-value	All
Overall (at least one)	20 (35)	23 (8)	$<10^{-4}$	43 (13)
PAH	15 (26)	15 (5)	$<10^{-4}$	30 (9)
Asbestos	11 (19)	11 (4)	$<10^{-4\#}$	22 (7)
Silica	10 (18)	5 (2)	$<10^{-4\#}$	15 (4)
Diesel	6 (11)	2 (1)	$<10^{-4\#}$	8 (2)

TABLE 3 Passive smoking

	Overall				Workplace			
	Men	**Women**	**p-value**	**All**	**Men**	**Women**	**p-value**	**All**
Missing n	7	43		50	7	43		50
Never exposed	30/58 (52)	85/276 (31)	0.002	115/334 (34)	47/58 (81)	227/276 (82)	0.827	274/334 (82)
Ever exposed	28/58 (48)	191/276 (69)		219/334 (66)	11/58 (19)	49/276 (18)		60/334 (18)
Missing data		3		3		1		1
Length of exposure								
<20 years	15/28 (54)	49/188 (26)	0.002	64/216 (30)	8/11 (73)	23/48 (48)	NC	31/59 (53)
20–30 years	11/28 (39)	70/188 (37)		81/216 (38)	2/11 (18)	15/48 (31)		17/59 (29)
>30 years	2/28 (7)	69/188 (37)		71/216 (33)	1/11 (9)	10/48 (21)		11/59 (19)
Exposed in childhood								
Exposed in adulthood only								

Couraud et al, Eur Respir J 2015

Caractéristiques du patient non-fumeur

Age médian

Cohorte	Sexe	Non-fumeur	Ex-fumeur	Fumeur actif
NHS	F	64	68	64
CTS	F	67	70	67
MEC	F	72	70	67
U/OLCR	F	67	66	63
NHEFS	F	71	67	62
HPFS	H	67	71	68
MEC	H	72	72	69
U/OLCR	H	64	71	64
NHEFS	H	78	72	69

Wakelee et al J Clin Oncol 2007

Histologie (% adénocarcinome)

Cohorte	Sexe	Non-fumeur	Ex-fumeur	Fumeur actif
NHS	F	70	50	42
CTS	F	64	54	34
MEC	F	58	46	32
U/OLCR	F	64	46	38
MEC	H	53	42	31
U/OLCR	H	67	36	34

Wakelee et al J Clin Oncol 2007

Table 2 Distribution of lung cancer histology, grouped by gender

Type of histology	Total, *n* (%)	Male, *n* (%)	Female, *n* (%)
Adenocarcinoma	1,209 (78.51)	234 (73.35)	975 (79.85)
Squamous cell carcinoma	92 (5.97)	28 (8.78)	64 (5.24)
Large cell carcinoma	7 (0.45)	3 (0.94)	4 (0.33)
Small cell carcinoma	18 (1.17)	6 (1.88)	12 (0.98)
Other unspecified carcinoma	214 (13.90)	48 (15.05)	166 (13.60)

Lo et al, Cancer Causes Control 2013

Small-Cell Lung Cancers in Patients Who Never Smoked Cigarettes

Anna M. Varghese, MD,† Maureen F. Zakowski, MD,†‡ Helena A. Yu, MD,*† Helen H. Won, MS,‡§ Gregory J. Riely, MD, PhD,*† Lee M. Krug, MD,*† Mark G. Kris, MD,*† Natasha Rekhtman, MD, PhD,‡ Marc Ladanyi, MD,‡§ Lu Wang, MD, PhD,‡ Michael F. Berger, PhD,‡§ and M. Catherine Pietanza, MD*†*

23/1040 CBPC = 2,2 % non-fumeurs

J Thorac Oncol 2014

Small-cell lung cancer detection in never-smokers: clinical characteristics and multigene mutation profiling using targeted next-generation sequencing

J.-M. Sun[1,†], Y.-L. Choi[2,†], J. H. Ji[3], J. S. Ahn[1], K.-M. Kim[2], J. Han[2], M.-J. Ahn[1] & K. Park[1*]

Ann Oncol 2015

50/391 CBPC = 12,8 % non-fumeurs

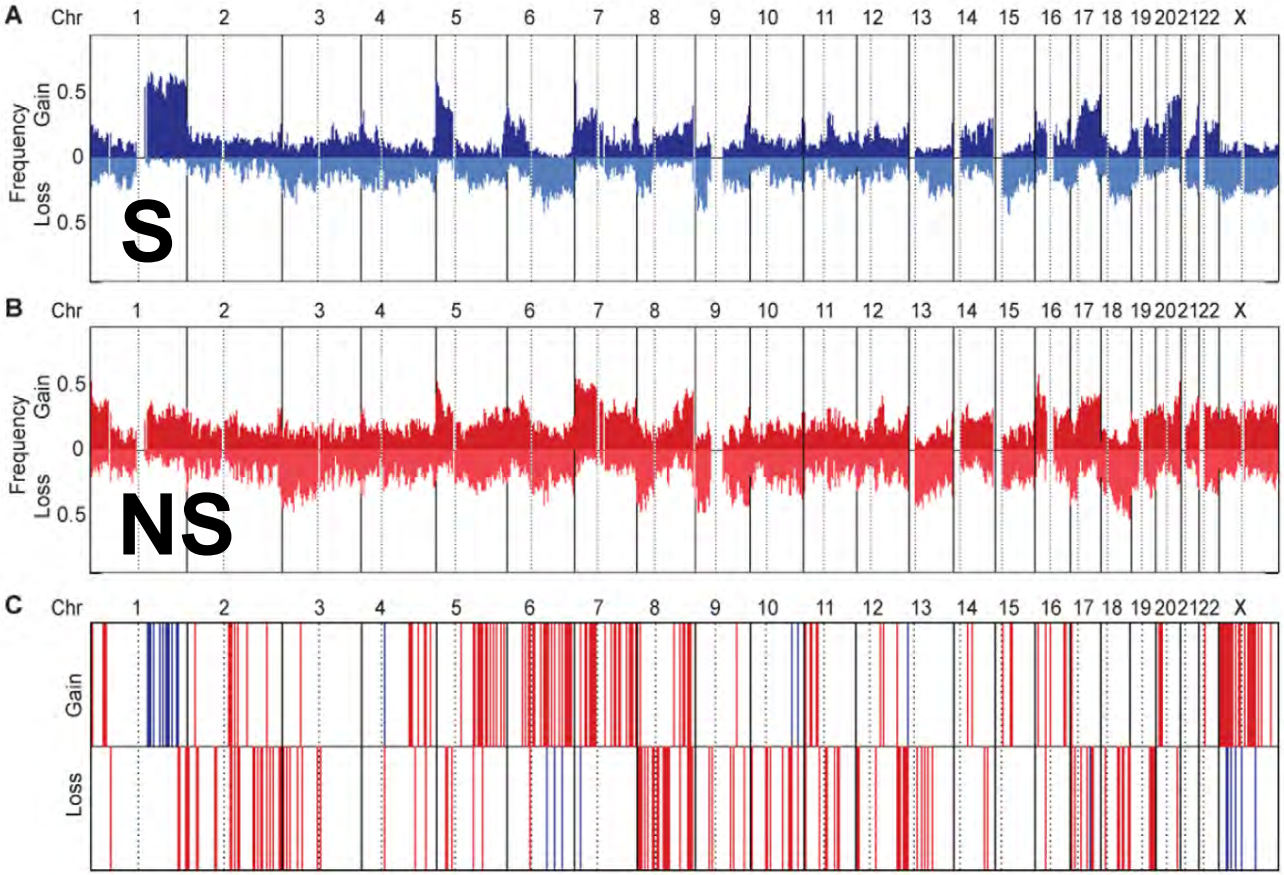
Anomalies moléculaires

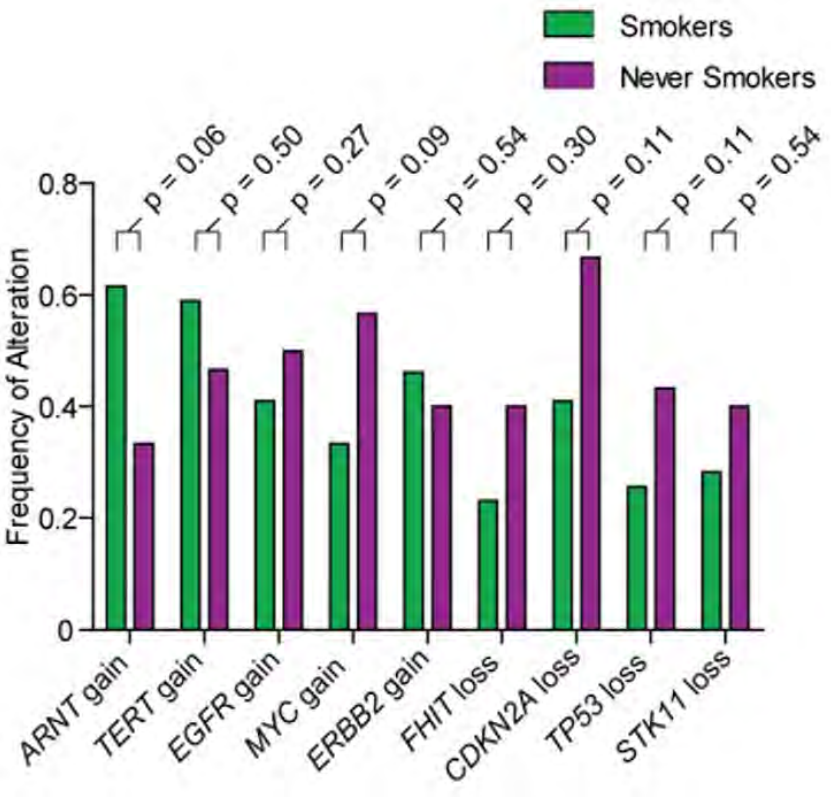
OPEN ACCESS Freely available online

PLoS one

Lung Adenocarcinoma of Never Smokers and Smokers Harbor Differential Regions of Genetic Alteration and Exhibit Different Levels of Genomic Instability

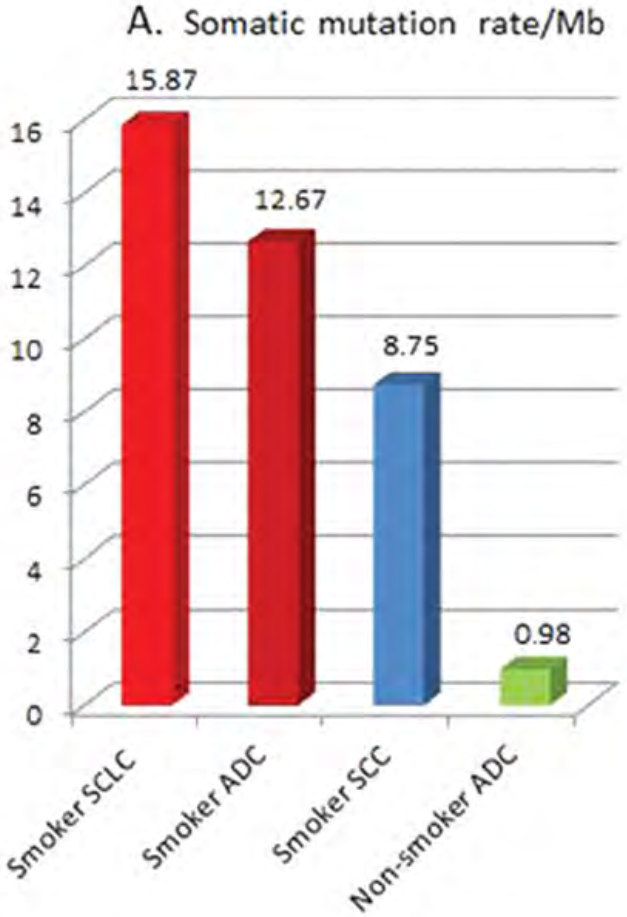
Kelsie L. Thu[1]*, Emily A. Vucic[1], Raj Chari[1,2], Wei Zhang[3], William W. Lockwood[1,4], John C. English[5], Rong Fu[6], Pei Wang[6], Ziding Feng[6], Calum E. MacAulay[1], Adi F. Gazdar[3], Stephen Lam[1], Wan L. Lam[1]

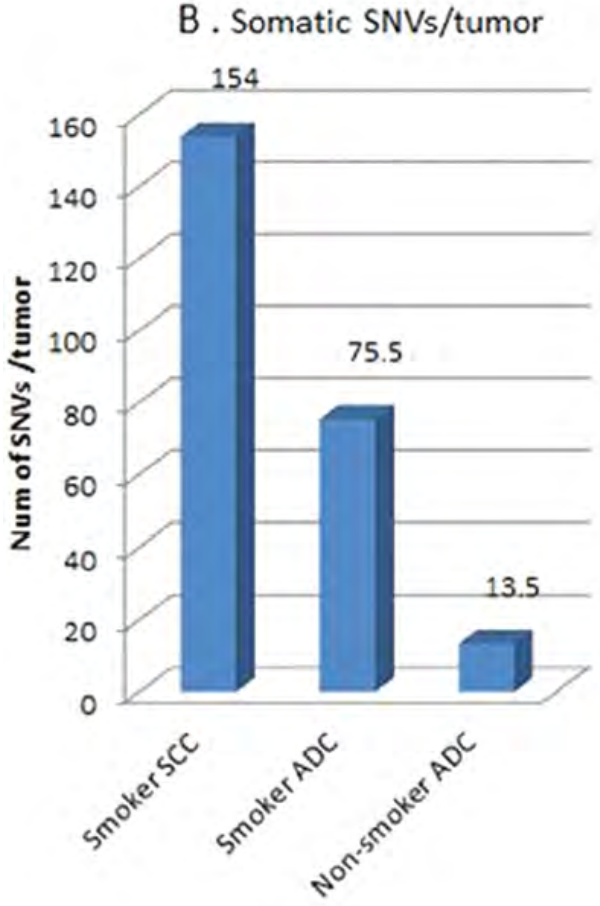




Differences in Driver Genes Between Smoking-Related and Non–Smoking-Related Lung Cancer in the Chinese Population

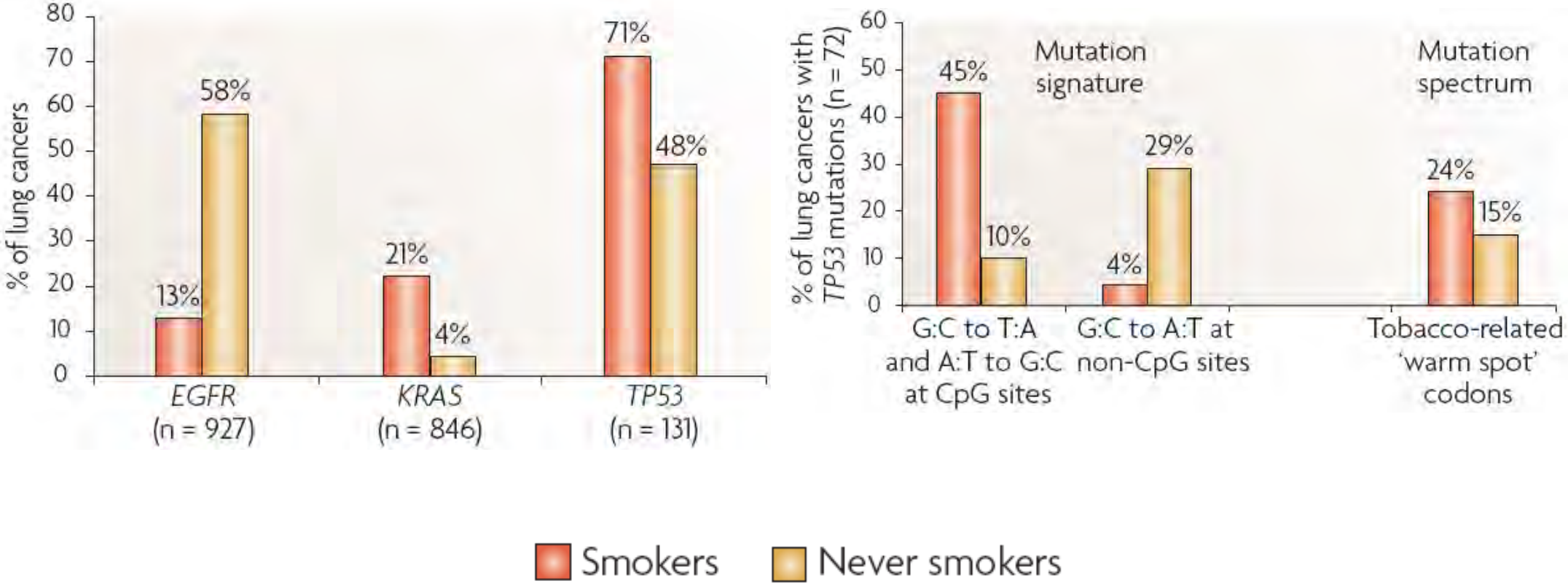
Lan-Ying Gou, PhD[1,2]; Fei-Yu Niu, PhD[1,2]; Yi-Long Wu, MD[2]; and Wen-Zhao Zhong, PhD[2]





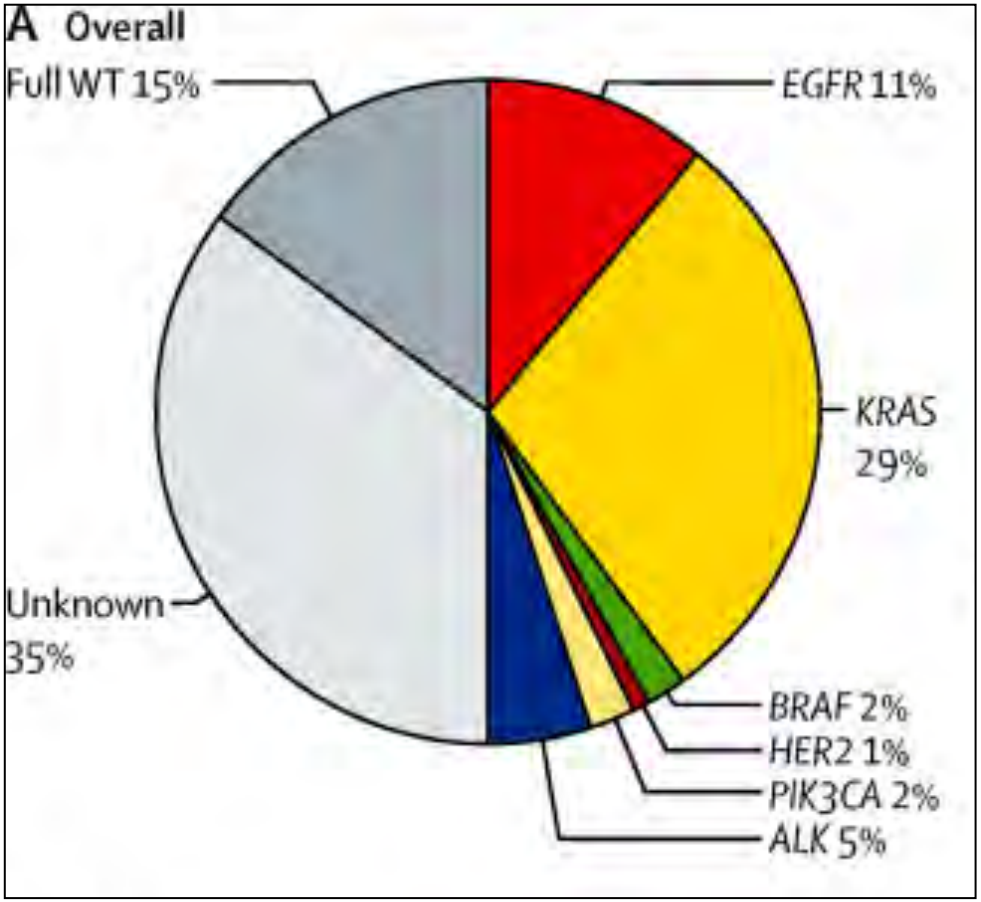
Cancer 2015

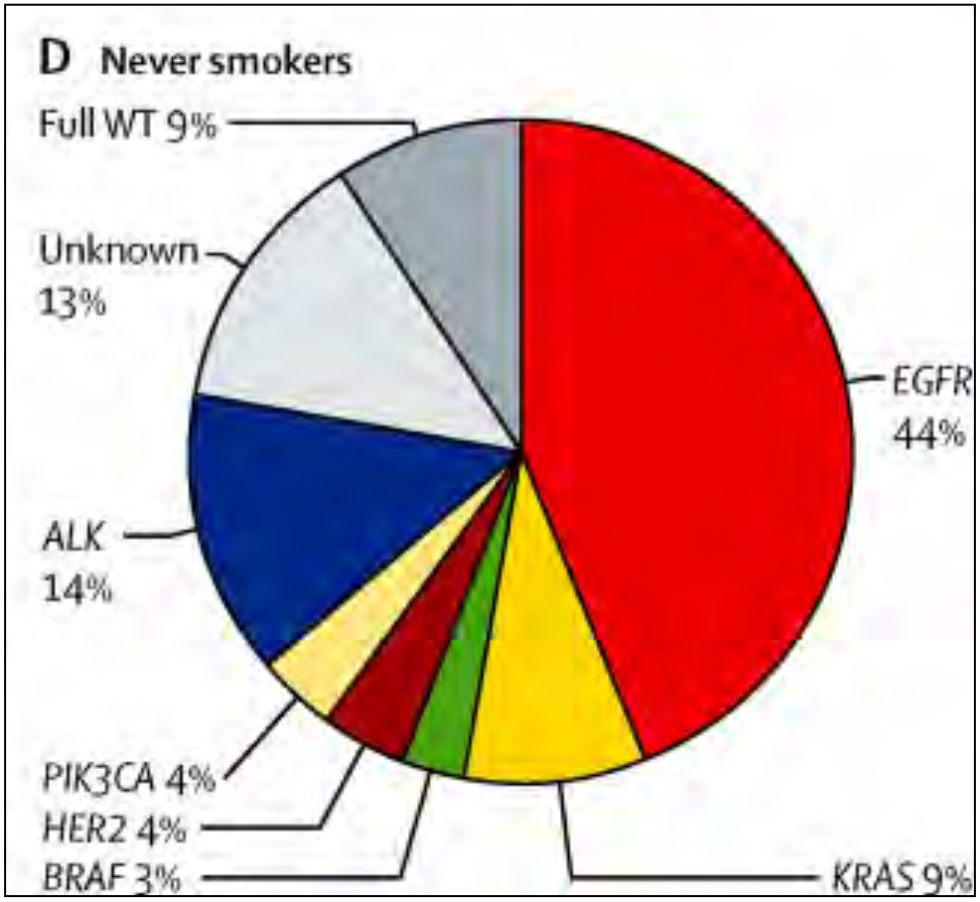
Répartition mutations EGFR, Kras, p53



Sun et al Nature Reviews Cancer 2007

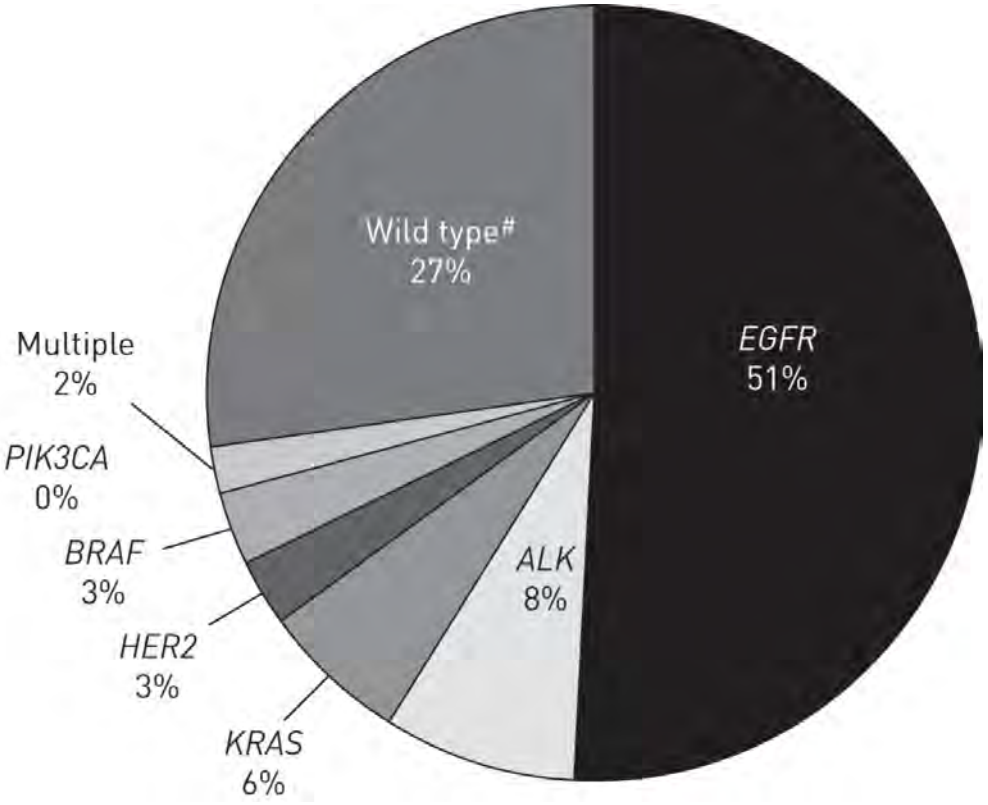
Anomalies moléculaires





Barlesi et al, Lancet 2016

Fréquence des anomalies mutationelles chez le non-fumeur



Couraud et al, Eur Respir J 2015

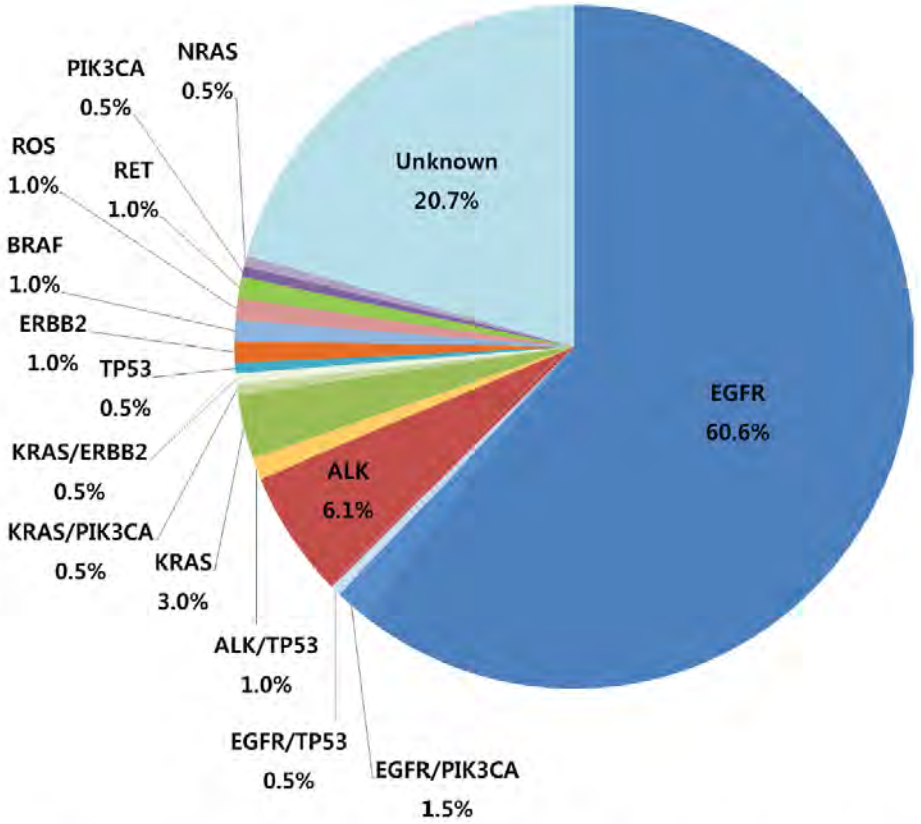
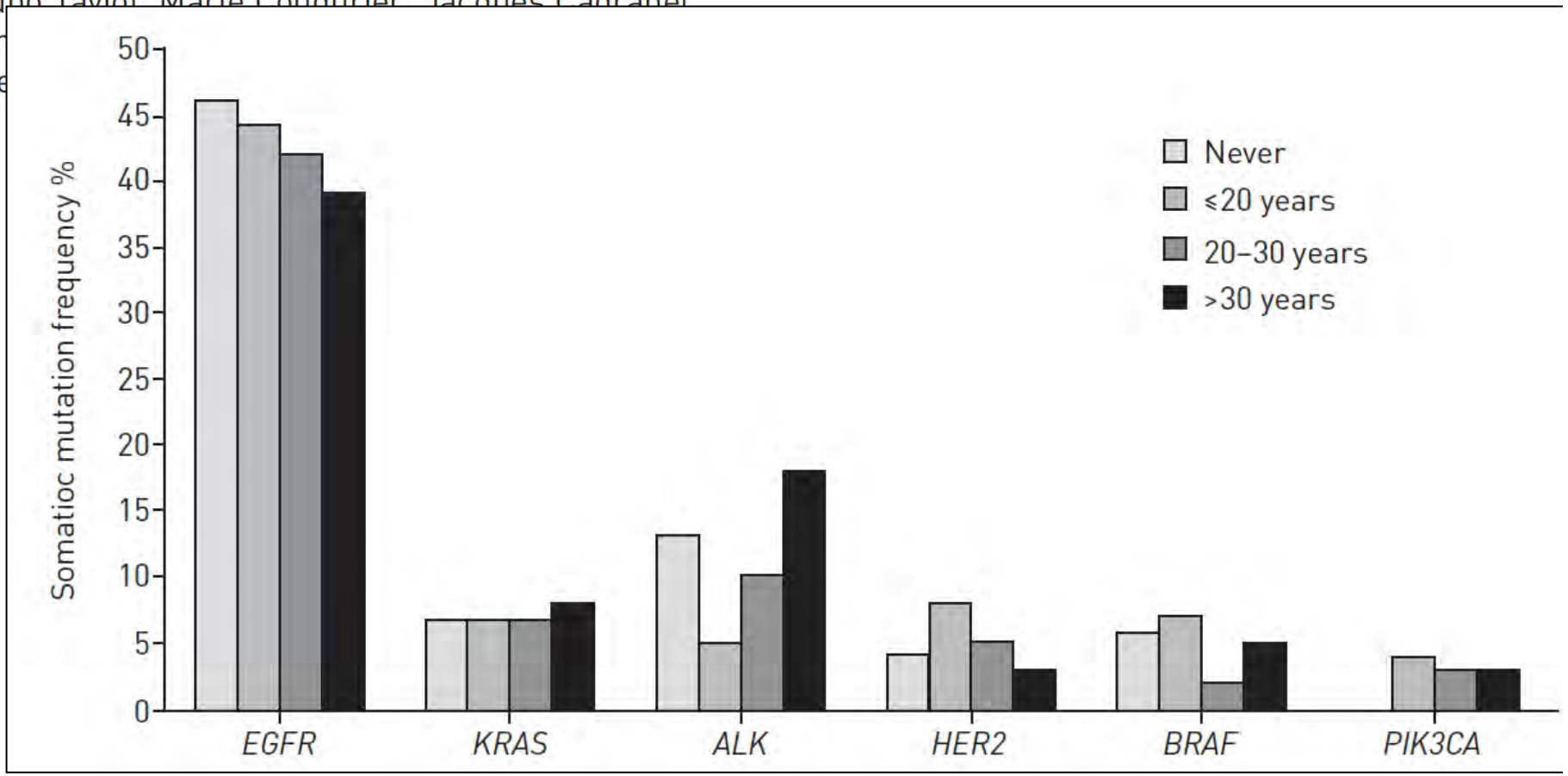


Figure 2: Frequency of driver gene mutations in lung adenocarcinomas from East Asian never-smoker females.

Ha et al, Oncotarget 2015

No impact of passive smoke on the somatic profile of lung cancers in never-smokers

Sébastien Couraud, Didier Debieuvre, Lionel Moreau, Patrick Dumont,
Jacques Margery, Elisabeth Quoix, Bernard Duvert, Laurent Cellerin,
Nathalie Baize, Bruno Tayiot, Marie Coudurier, Jacques Cadranel,
Pascale Missy, Fran
Pierre-Jean Souque

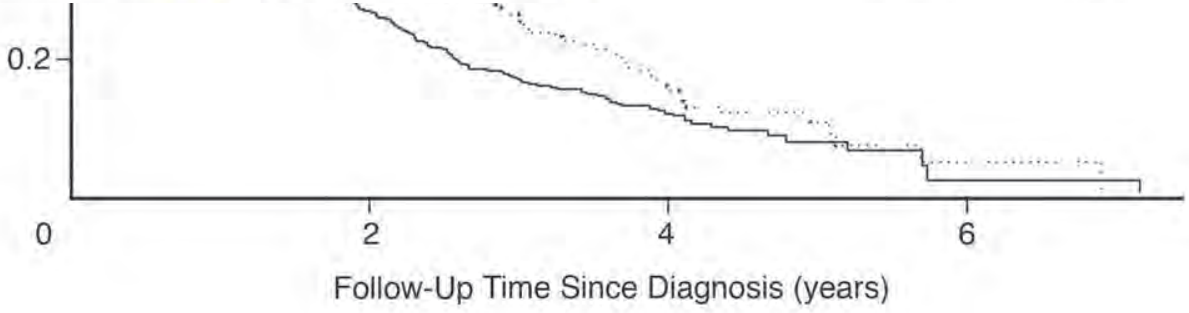


Eur Respir J 2015

Pronostic

5-year overall survival

Authors	Ethnicity	Stages	% female	% adenocarcinoma	HR for survival (vs. smokers)
Yano et al. [44]	Japanese	I–IIIA (all operable)	85.8	87.8	0.761 (0.594–0.976)
Toh et al. [3]	Chinese	I–IV (80% = III, IV)	68.5	69.9	0.771 (0.618–0.962)
Nordquist et al. [58]	US American	I–IV (70% = III, IV)	78.0	100% (selection of only adenoca)	0.755 (0.591–0.964)
Kawaguchi et al. [59]	Japanese	III–IV	74.9	87.4	0.880 (0.797–0.970)



Toh et al J Clin Oncol 2006

Yano et al, nt J Clin Oncol 2011

Med Oncol (2015) 32:339
DOI 10.1007/s12032-014-0339-3

ORIGINAL PAPER

Effect of smoking on survival from non-small cell lung cancer: a retrospective Veterans' Affairs Central Cancer Registry (VACCR) cohort analysis

Variables	Stage I–II		Stage III–IV	
	Risk of death HR (95 % CI)	*p* value	Risk of death HR (95 % CI)	*p* value
Smoking status				
Never smoker	1.00		1.00	
Past smoker	1.01 (0.94–1.08)	0.77	1.01 (0.96–1.06)	0.75
Current Smoker	1.07 (1.00–1.14)	0.06	1.06 (1.01–1.11)	0.01

61.440 patients

Smoking Status and Survival in the National Comprehensive Cancer Network Non–Small Cell Lung Cancer Cohort

Amy K. Ferketic… sa, MSPH[3];
Thomas A. D'Amico, M… e M. Pisters, MD[7];

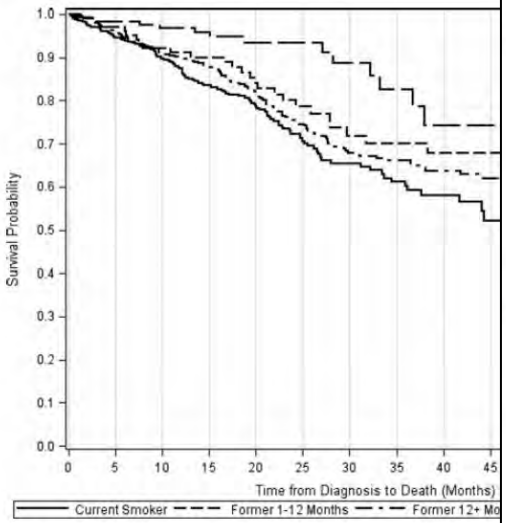
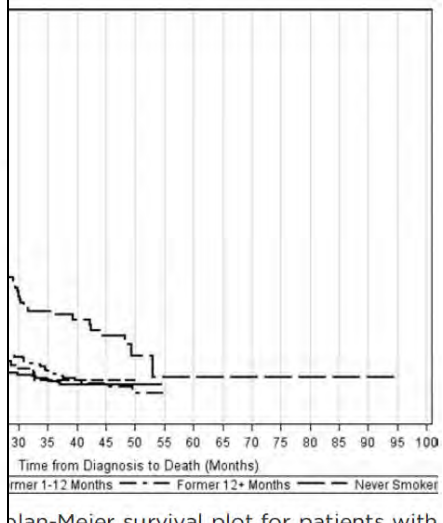


Figure 1. This is a Kaplan-Meier survival plot … stage I and II non–small cell lung cancer acc… ing status at diagnosis

TABLE 3. Results From Cox Proportional Hazards Regression Models According to Disease Stage

Variable	HR (95% CI)[a]
Stage I and II, n = 1195	
Current smokers	1.00
Former smokers	
1-12 mo	0.80 (0.51-1.24)
>12 mo	0.84 (0.65-1.08)
Never smokers	0.47 (0.26-0.85)
Stage III, n = 1117	
Current smokers	1.00
Former smokers	
1-12 mo	0.79 (0.59-1.07)
>12 mo	0.85 (0.70-1.03)
Never smokers	0.51 (0.38-0.68)
Stage IV, n = 1888	
Estimates for patients aged 45 y	
Current smokers	1.00
Former smokers	
1-12 mo	1.09 (0.77-1.55)
>12 mo	0.70 (0.53-0.91)
Never smokers	0.39 (0.30-0.51)



…plan-Meier survival plot for patients with …ll lung cancer according to smoking sta-

Cancer 2013

Principales caractéristiques du non-fumeur

Sexe	Prédominance femme
Facteurs de risque	Tabagisme passif …
Histologie	Prédominance Adénocarcinome
Age	Plus jeune (en Asie)
Survie	Meilleure
Profil mutationnel	Distinct du fumeur
	Mutation EGFR: Plus fréquente Translocation ALK: Plus fréquente Translocation ROS: Plus fréquente Mutation KRAS: Rare

FORMATION CONTINUE

Certificat européen interuniversitaire en oncologie thoracique

Examen donnant droit à une attestation de réussite délivrée par l'Université Libre de Bruxelles et l'Université d'Aix-Marseille

- L'examen aura lieu durant le CPLF à Marseille, le vendredi 27 janvier 2017 à 14h au Mercure Prado
- Condition : être inscrit et avoir assisté au cours du GOLF qui précède le CPLF
- L'inscription à l'examen se fait auprès de Madame Caroline Gustin : secret.sculier@bordet.be avec la preuve de participation au cours du GOLF 2016
- Frais d'inscription : 50 € à payer avant le 15/12/2016
  - Soit par Virement bancaire à l'ELCWP : compte IBAN : BE62 3100 7281 5461 - Swift/Bic : BBRUBEBB - Banque ING, rue d'Arlon 26 à 1050 Bruxelles avec votre nom en communication + examen
  - soit par Visa card/Eurocard (Carte bleue) n°
    - _ _ _ _ / _ _ _ _ / _ _ _ _ / _ _ _ _
    - *Date d'expiration……/……*
    - *Nom du titulaire :……*
    - *Signature :*
    - Date limite d'inscription : 15 décembre 2016 - **Aucun chèque ne sera accepté**